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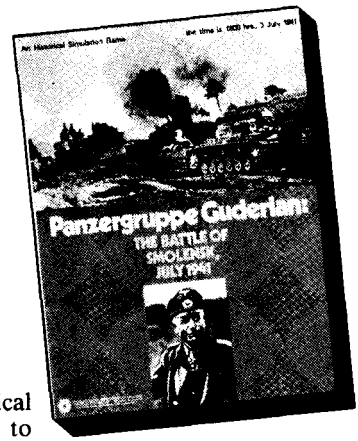

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CHANGING THE GUARD

BUT NOT TOO MUCH

Seven years ago I came home from a camping trip in Maine and received one of the greatest shocks of my life.

Going through the mail that had accumulated in my absence, I opened an innocent-looking *SFWA Bulletin* and found myself staring at a drawing of the only editor Analog had had in my lifetime, with the caption JOHN WOOD CAMPBELL, 1910-1971. It hardly seemed possible. Like many people, I think I had subconsciously assumed that Campbell would go on forever—and I had a letter from him, written just days before his death, in which he sounded spunky and ornery as ever.

The shock came on several levels. First was the sense of personal loss of a very special human being. Though I had not spent many hours in John's company, I felt that I knew him rather well and I had looked forward to many more. Then, on a more practical level, was the question: what would become of Analog, that unique magazine that I had grown up with and considered at least as important a part of my education as school? And, incidentally, what would become of my own incipient writing career, since at that time only Analog had published my stories?

By a peculiar coincidence, I have just returned from another trip to Maine, this time to find myself assuming the editorship. It seems hardly more credible than the news of Campbell's death. The circumstances this time are more pleasant. Ben Bova (whom I once introduced as "a man whose existence came as a considerable personal relief to me") is very much alive and will continue to make his mark elsewhere. He has left Analog for sound personal reasons which in

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no way reflect on the soundness of the magazine. But I feel quite sure that many of you, the readers, are again asking the same question I asked seven years ago: now what? Now that this character Schmidt is in charge, what's he going to do to my magazine?

Let me reassure you. The first thing—the most important thing—I'm going to do is to try to keep it your magazine, and the *best* magazine—for you—that all of us can make it. My starting axiom: Analog works, now. It is a going concern with a large, established audience and a highly competent staff who at this point know more than I do about *how* it works. My first job is to learn all I can about how it works so I can ensure that it continues to do so. Then, as I gain experience and get feedback from you, I hope to find ways to make it work still better. But gradually, not drastically. I don't plan to come into something which is already working well and immediately make wholesale, sweeping changes.

Certain subtle kinds of evolution, of course, are inevitable and desirable. Analog has a long tradition, which I plan to continue, of having the editor personally read all submissions, watching carefully not only for top-quality stories and articles, but for promising new writers. Such a *modus operandi* implies that the magazine's content reflects, perhaps more strongly than that of some other magazines, its editor's personality. And I'm not the same as either Campbell or Bova, though I do have a good deal in common with both of them.

The basic philosophy, the kinds of things I'm looking for, will remain pretty much the same. Strong ideas, strong characters who grow, strong story lines—stories about *people* (or reasonable facsimiles) in situations from which the speculative elements are inseparable. I want to see the implications of both ideas and characters developed as far as the writers can take them, but their relative importance can vary a lot from story to story. There'll be plenty of room for variety. I can see myself using stories ranging from old-fashioned technical problem stories to those in which technical aspects are very much in the background; from the most careful and conservative extrapolation of known science to the most imaginative speculation on utterly new concepts; from pure comedy (a high and difficult art form) to deepest tragedy. The overriding principle will be that the stories should be, above all, entertaining (in a much broader sense than some people use that word) and satisfying. In my view, a story which fails as entertainment fails as a story, and a story which entertains well enough has no obligation to do anything more—though memorable stories often do, and I'm all for that, too.

I have little use for obscurity or, for the most part, futility. If I have to struggle too hard to figure out what's going on in a story, chances are I'll figure it's not very well told and I won't buy it. And if the characters can't solve their problems, it should be because the problems are genuinely

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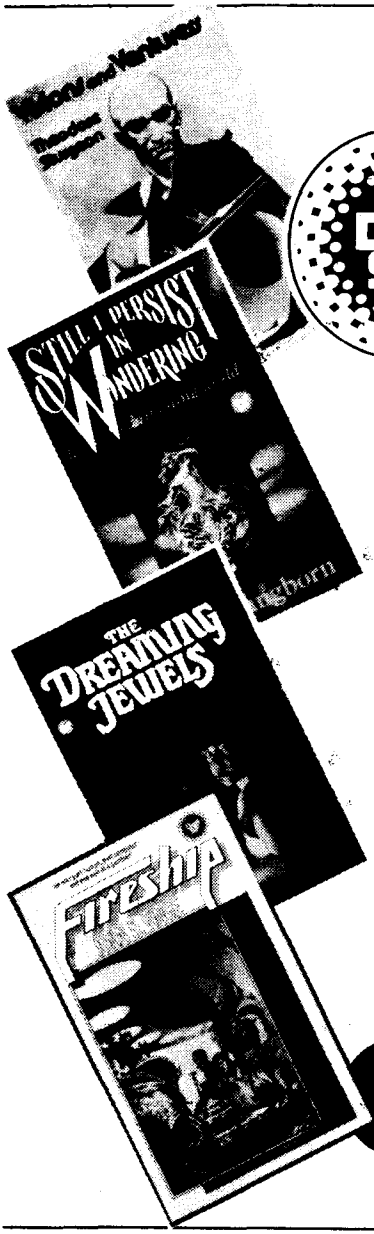

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too big, not because the characters are too small.

The general format of the magazine—the mix of fiction, nonfiction, and features—I envision as staying approximately the same, at least for the time being. I do have a few ideas for things we might try, but I'd rather not talk about them in print until such time (if any) as they become more definite. They're not drastic, anyway.

And what about the editorials?

This one, I expect, is atypical—brief, without new or controversial ideas, a mere introduction to myself and what I foresee myself doing in the near future. Henceforth, though I may print an occasional guest editorial, I expect to use this space in the Campbellian manner (though not, I fear, with Campbellian skill) as a vantage point from which to goad, inspire, irritate, or otherwise provoke all of you out there into thinking about all manner of things. And in connection with that, a word of warning.

In his later days, Campbell alienated quite a few people with some of his stands, and I think that in a good many cases the alienation was based on a fundamental misconception. People assumed he believed everything he wrote, and while I may be mistaken, I have the strong impression that this was not the case. Rather, Campbell believed that the surest way to get people to really think about something—especially something they have long considered settled—is to show them a radically contrasting viewpoint, not quite diametrically opposed (that would be too simple) but different enough and convincingly enough presented that they feel infuriated into trying to refute it. So whenever one viewpoint on an issue appeared to claim too unanimous a share of what was being said about it, he would shift his own position to remain the opposition. And he had to appear to believe each stand he took, or people would not take him seriously enough to argue.

I think he was right. I have found the same basic technique useful in my most satisfying teaching experiences. (So, I'm told, did a fellow named Socrates, considerably before either of our times.) So let me serve notice now, once and for all: in future editorials, I expect to toss out a lot of ideas on a lot of subjects. A good many of them will actually represent my current beliefs at least fairly well, though I reserve the right to change those beliefs at any time. (It's been a long time since I believed my current opinions were finished products. I used to be Sure of a lot of things, but they all turned out to be wrong. . . .) And some of the ideas I throw out may be a long way from my actual beliefs. They may simply be things I want to try out, to see what kinds of answers people can give to them. For that I make no apology. Nor will I let it interfere with the vigor and apparent sincerity with which I put forth and defend such ideas. If they stir you up enough to lead to some better ones (and maybe some good stories), they will have served a good purpose.

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For it is in this area that science fiction in general, and Analog in particular, has its most distinctive strength. Good storytelling exists in other fields; we have (and must have) that here, too, but in addition we have, more than any other field I've encountered, a propensity for exploring new ideas—trying them out, exploring their consequences, seeking alternatives.

Before reality has closed off too many of the options.

This exploration has always been the essence of Analog, both in the fiction and articles and in the ensuing (and often heated) dialogues in Brass Tacks. All this, I trust, will continue and grow. The editorials (and my work with our contributors) will be my contribution to it. For the rest I look to you, the readers and writers.

I'm looking forward to it. I hope you are, too. STANLEY SCHMIDT

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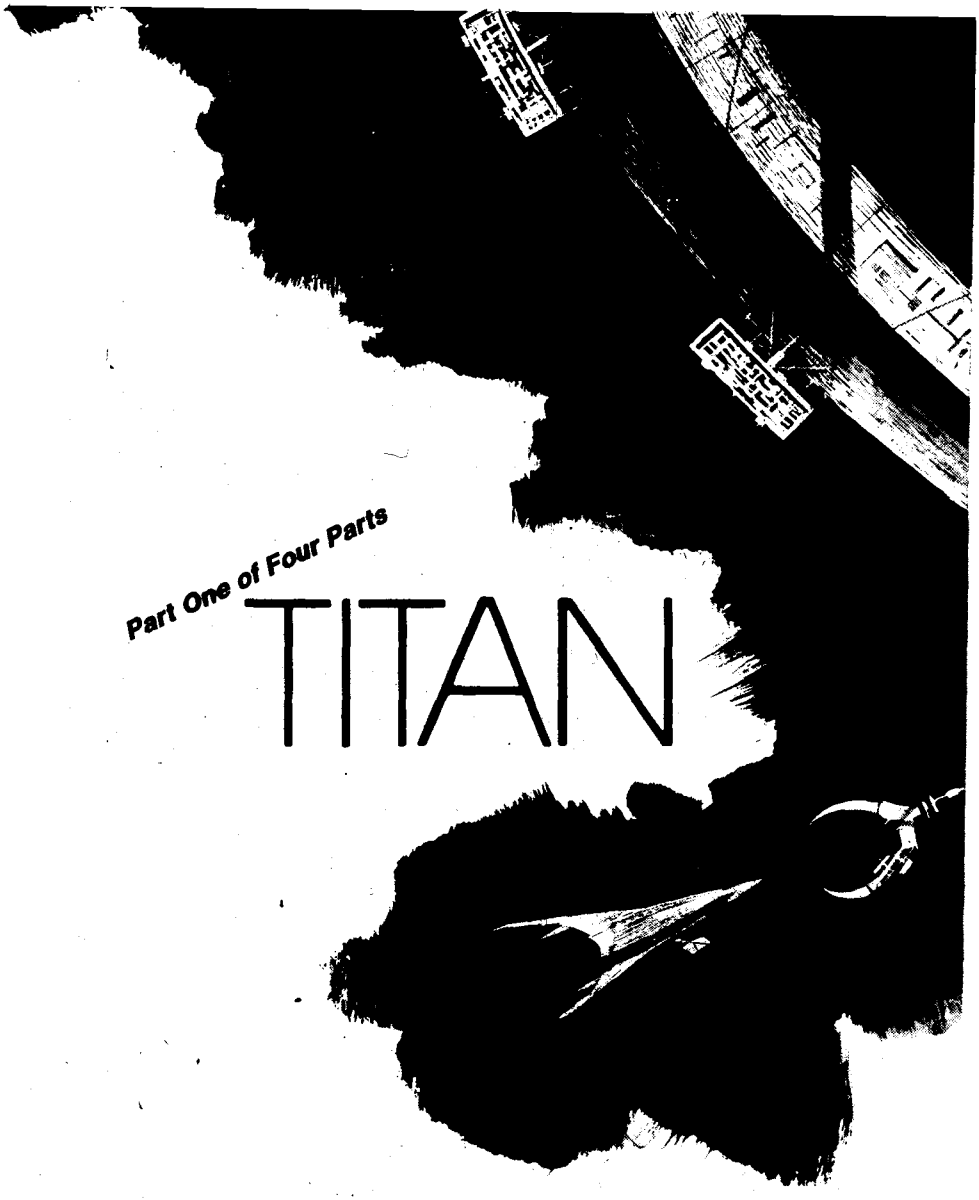

Part One of Four Parts

TITAN

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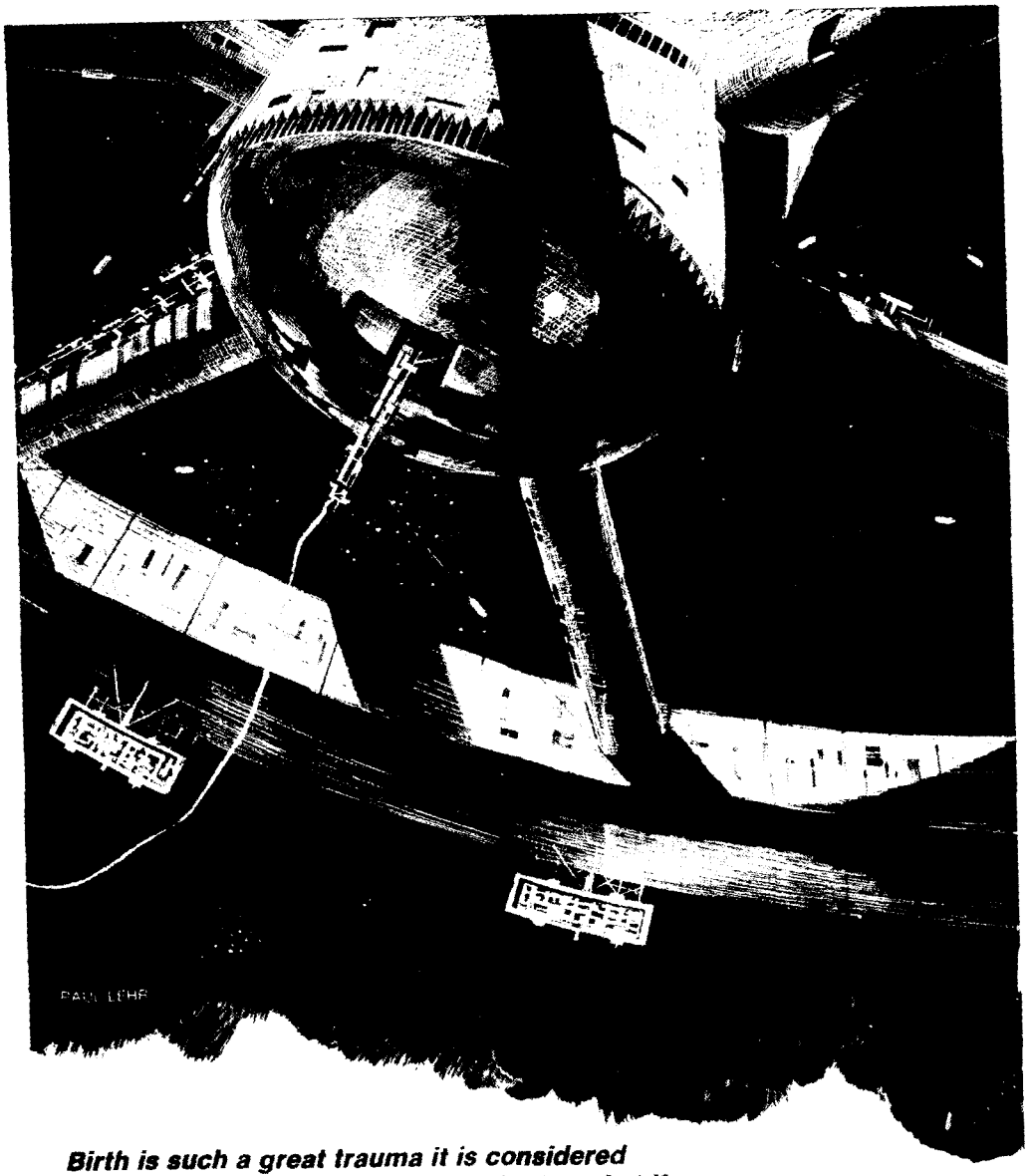

Birth is such a great trauma it is considered fortunate that no one remembers it. But what if one were conscious and aware of the entire experience?

JOHN VARLEY

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CHAPTER ONE

There was no light. Cirocco would not have minded, but there was no sound, either.

Moments had once been consecutive; they could be strung together like beads on a string. Now the beads scattered as soon as she touched them.

No smell, no taste, no sense of touch. No kinesthetic awareness of a body. Not even a sense of paralysis.

What was left?

A name. For an eternity she had not had one. She had forgotten it many times and would forget it again, but if she was careful she could build a past on it. Repeating it was the key to unreeling bits of film in her mind's eye.

Cirocco Jones, also known as Rocky, though not by choice.

"That's shur-*rock*-o. It's a hot wind from the desert, or an old model Volkswagen. Mom never told me which she had in mind."

She had said that to someone; if only she could remember the face.

"Call me Captain Jones." Captain of what?

Of the *DSV Ringmaster*, DSV for deep space vessel, on its way to Saturn with seven aboard.

One of them was named Gaby Plauget.

"Rocky, would you take a look at this?"

"That's Cap'n Jones to you. Show me in the morning."

"It's sort of important."

Cirocco was at her wash basin, her face covered in soap. She groped for a towel and wiped the greenish goop away. It was the only sort of soap the recyclers would eat.

She squinted at the two pictures Gaby handed her.

"What is it?"

"Just the twelfth satellite of Saturn." Gaby was not entirely successful at hiding her excitement.

"No fooling?" Cirocco frowned from one picture to the other. "Just a lot of little black dots to me."

"Well, yeah. You can't tell anything without the comparometer. That's it right there." She indicated an area.

"Let's go take a look."

Cirocco rummaged through her locker and found a pea-green shipsuit that smelled as good as any of them. Most of the handy velcro patches were peeling.

Her room was at the bottom of the carousel, midway between ladders three and four. She followed Gaby around the curving floor, then pursued her up the ladder.

Each rung was a little easier than the last until, at the hub, they were weightless. They pushed off from the slowly rotating ring and drifted down the central corridor to the Science Module: SCIMOD in NASAese. It was kept dark to make the instruments easier to read, and was as colorful as the inside of a jukebox. Cirocco liked it. Green lights blinked and banks of television screens hissed white noise through confetti clouds of snow. Eugene Springfield and the Polo sisters floated around the central holo tank.

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Their faces were bathed in the red glow.

Gaby handed the plates to the computer, punched up an image-intensifying program, and indicated the screen Cirocco should watch. The pictures were sharpened, combined, then rapidly alternated. Two minuscule dots blinked, not far from each other.

"There it is," Gaby said proudly. "Small proper motion, but the plates are only twenty-three hours apart."

Gene called to them.

"Orbital elements are coming in," he said.

Gaby and Cirocco joined him. Cirocco glanced down and saw his arm go possessively around Gaby's waist, looked quickly away, noting that the Polo sisters had seen it and were just as careful not to notice. They had all learned to stay out of each other's affairs.

Saturn sat in the middle of the tank, fat and brassy. Nine blue circles were drawn around it, each larger than the last, each in the equatorial plane of the rings. There was a sphere on each circle, like a single pearl on a string, and beside the pearls were names and numbers: Mnemosyne, Janus, Mimas, Enceladus, Tethys, Dione, Rhea, Titan, and Hyperion. Far beyond those orbits was a tenth one, visibly tilted. That was Iapetus. Phoebe, the most distant, could not be shown on the scale they were using.

Now another circle was drawn in. It was an eccentric ellipse, almost tangent to the orbits of Rhea and Hyperion, cutting right across the circle that represented Titan. Cirocco studied it, then straightened. Looking up, she saw deep lines etched on Gaby's forehead as her fingers flew over the keyboard. With each program she called up, the numbers on her screen changed.

"It had a very close call with Rhea about three million years ago," she noted. "It's safely above Titan's orbit, though perturbations must be a factor. It's far from stabilized."

"Meaning what?" Cirocco asked.

"Captured asteroid?" Gaby suggested, one eyebrow raised doubtfully.

"The proximity to the equatorial plane would make that unlikely," one of the Polo sisters said. April or August? Cirocco wondered. After eighteen months together she still couldn't tell them apart.

"I was afraid you'd say that." Gaby chewed a knuckle. "Yet if it was formed with the others, it ought to be less eccentric."

The Polo shrugged. "There are ways to explain it. A catastrophic event in the recent past. It would be easy to move it."

Cirocco frowned. "Just how big is it, then?"

The Polo—August, she was almost sure it was August—looked at her with that calm, strangely unsettling face. "I should say about two or three kilometers. Possibly less."

"Is *that* all?"

Gene grinned. "You give me the numbers, I'll land on it."

"What do you mean, 'is that all?' "

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Gaby said. "It couldn't have been very much bigger, not to have been sighted by the Lunar scopes. We would have known about it thirty years ago."

"All right. But you interrupted my bath for a damn pebble. It hardly seems worth it."

Gaby looked smug. "Maybe not to you, but if it was a tenth that size, I'd still get to name it. Discovering a comet or an asteroid is one thing, but only a couple people each century get to name a moon."

Cirocco released her toehold on the holo tank strut and twisted toward the corridor entrance. Just before she left she glanced back at the two tiny dots still flashing on the screen overhead.

Two tiny dots. It was hard to believe how important those dots had become. Remembering them, Cirocco thought she had an idea of where she was.

She was still unable to link the scene in the *Ringmaster* with her present dark universe. There was a line of space-time events that connected the discovery with this place, but to trace it would take her through a time of screeching metal and shattering glass, a time that flashed through her mind at random, like photos tossed in the air.

And it was beginning to seem that she might actually be experiencing something. Warmness, and wetness. And—yes!—hardness. An object, fat and clumsy, nestled against warm surfaces.There were hard objects that could be boulders or pinheads; size meant little to her, since she felt she must be as big as the universe.

It was her tongue. It rested in her mouth, the edges of it touching the insides of her teeth. She could even move it.

She counted her teeth with her tongue and tried to imagine numbers bigger than thirty-two. They existed, those numbers. She could give them names, but it had little point. They were irrational numbers, describing nothing in her universe. Fingers and toes would have helped.

She was never sure if what happened next was the result of anything she did. As she thought of fingers and toes, she became aware of them. They were somewhere in the boondocks, not as easy to locate as when perched reasonably on the ends of feet and hands, which in turn were connected to arms and legs, shoulders and hips, and a body which was firmly attached to a neck.

Which led to a head, where she had always lived, only she seemed to have misplaced it.

How careless.

The fingers wiggled when she told them to. So did the toes. She felt her fingers slide over each other.

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BEGINS:

Gaby has settled on Themis as the

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name for the new moon. Calvin agrees with her, though they arrived at the name from different directions.

Gaby mentions the alleged sighting of (what would have been) a tenth moon of Saturn by William Henry Pickering—discoverer of Phoebe, Saturn's outermost moon—in 1905. He named it Themis, and no one ever saw it again.

Calvin points out that five of the Saturnian moons are already named after the Titans of Greek myth (which is a special interest of his: see PUB/REL DISPATCH #0009, 1/3/24) and a sixth is called Titan. Themis was a Titan, so Calvin's mind is appeased.

Themis has things in common with the moon Pickering thought he saw, but Gaby is not convinced he actually sighted it. (If he did, she would not be listed as its discoverer. But to be fair, it seems too small and dim to be seen in even the best Lunar scopes.)

Gaby is formulating a cataclysmic theory of Themis's formation, the result of a collision between Rhea and a wandering asteroid. Themis might be the remnant of that asteroid, or a chunk knocked off of Rhea itself.

So Themis is proving an interesting challenge for

"—that wonderful gang of idiots you all know so well by now, the crew of the *DSV Ringmaster*." Cirocco leaned back from the typer touchplate, stretched her arms over her head, and cracked her knuckles. "Tripe," she muttered.

The green letters glowed on the screen in front of her, still with no period at the bottom.

It was a part of her job she always delayed as long as possible, but the NASA flak could no longer be ignored. Themis was an uninteresting chunk of rock, by all indications, but the publicity department was desperate for something to hang a story on. They also wanted human interest, "personality journalism," as they called it. Cirocco tried her best, but could not bring herself to go into the kind of detail the release writers wanted. Which hardly mattered anyway, since what she had just written would be edited, rewritten, discussed in conference, and generally jazzed up to "humanize" the astronauts.

Cirocco sympathized with their

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goal. Few people gave a damn about the space program. They felt the money could be better spent on Earth, on Luna, and at the L5 colonies. Why pour money down the rat-hole of exploration when there was so much benefit to be derived from things that were established on a businesslike basis, like Earth-orbital manufacturing? Exploration was terribly expensive, and there was nothing at Saturn but a lot of rock and vacuum.

She tried to think of some fresh, new way to justify her presence on the first exploratory mission in eleven years. They wanted color. They wanted something to fill the pages of Sunday supplements.

The sexual entanglements were out. Cirocco thought that was best kept private, and the time for those stories would have been early in the voyage, when it had all been happening. As of that moment, Cirocco was seeing Bill, Gaby was with either Gene or Calvin, and the Polo sisters had each other.

What about character studies? She had done Gaby, April and August. She thought about Bill: forty, the oldest of a young crew, a face dominated by a lumpy nose and jowls that could have graced a basset hound. He was balding, but his body was ten years younger than his face. His hands were clean and neat. He was good with machinery, but not the greasy, noisy kind. His tool kit would fit in his shirt pocket, tools so tiny that Cirocco wouldn't dare handle them.

No, Bill was too close. Gene? He was the only married crew member. He had quick reflexes and a boyish face, but otherwise Cirocco could not think of much to say about him. They were formally polite, but there was something about him she did not like.

That left Calvin. He was a general surgeon trained to be competent as a biologist as well. He was black, born and raised in O'Neill One. He was the only crew member taller than Cirocco. He tended to shyness; Calvin's life so far had been little but schooling. The voyage of *Ringmaster* was his first step into the larger world outside the classroom, and Cirocco didn't think he liked it.

While she was thinking, a face appeared on her screen. It might have been April, and it might have been August.

"Captain, I'm sorry to disturb you."

"That's okay. I wasn't busy."

"We have something up here you should see."

"Be right up."

She thought it was August. Cirocco had worked on keeping them straight, since twins generally resent being mistaken for each other. She had gradually realized that April and August didn't care.

But April and August were not ordinary twins.

Their full names were April 15/02 Polo and August 3/02 Polo. That was what was written on their respective test tubes, and that is what the scientists who had been their midwives had put on the birth certificates. Which had always struck Cirocco as two

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excellent reasons why scientists should not be allowed to fool around with experiments that lived and breathed and cried.

Their mother, Susan Polo, had been dead for five years at the time of their birth, and could not protect them. Nobody else seemed ready to give them any mothering, so they had only each other and their three clone-sisters for love. August had told Cirocco once that the five of them had only one close friend while growing up, and that had been a Rhesus monkey with a souped-up brain. He had been dissected when the girls were seven.

"I don't want to make it sound too brutal," August had said on that occasion, a night when some glasses of Bill's soybean wine had been consumed. "Those scientists were not monsters. A lot of them behaved like kindly aunts and uncles. We had just about anything we wanted. I'm sure a lot of them loved us." She had taken another drink. "After all," she said, "we cost a lot of money."

What the scientists got for their money was five quiet, rather spooky geniuses, which is just what they ordered. Cirocco doubted they had bargained for the incestuous homosexuality, but felt they should have expected it, just as surely as the high IQ. They were all clones of their mother—the daughter of a third-generation Japanese-American and a Philipino. Susan Polo won the Nobel prize in physics and died young.

Cirocco looked at August as the woman studied a photo on the chart table. She was exactly like her famous mother as a young woman: small, with jet-black hair and a trim figure, and dark expressionless eyes. Cirocco had never thought Oriental faces were as similar as many Caucasians found them to be, but April's and August's faces gave nothing away. Their skin was the color of coffee with lots of cream, but in the red light of the science module August looked almost black.

She glanced at Cirocco, showing more excitement than usual for her. Cirocco held her eye for a moment, then looked down. Against a field of pinpoint stars, six tiny lights were arranged in a perfect hexagon.

She looked at it for a long time.

"It's the damdest thing I ever saw on a starplate," she conceded. "What is it?"

Gaby was strapped to a chair on the other side of the compartment, sipping coffee from a plastic bulb.

"It's the latest exposure of Themis," she said. "I took it over the last hour with my most sensitive equipment and a computer program to justify the rotation."

"I guess that answers my question," Cirocco said. "But what *is* it?"

Gaby waited a long time before replying, taking another sip.

"It is possible," she said, sounding detached and dreamy, "for several bodies to orbit around a common center of gravity. Theoretically. No one's ever seen it. The configuration is called a rosette."

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Cirocco waited patiently. When no one said anything, she snorted.

"In the middle of Saturn's satellite system? For about five minutes, maybe. The other moons would perturb them."

"There's that, too."

April and Calvin had entered the room. Now Calvin looked up.

"Isn't anyone going to say it? This isn't a natural arrangement. Somebody made this."

Gaby rubbed her forehead.

"You haven't heard it all. I bounced radar signals off it. They came back telling me Themis was over thirteen kilometers in diameter. Density figures all cockeyed, too, making it less dense than water by quite a bit. I thought I was getting screwed-up readings because I was working at the limits of my equipment. Then I got this picture."

"Six bodies or one?" Cirocco asked.

"I can't tell for *sure*. But everything points to one."

"Describe it. What you think you know."

She consulted her printout sheets, but obviously did not need them. The figures were clear in her mind.

"Themis is thirteen hundred klicks across. That makes it Saturn's third largest moon, about the size of Rhea. It must be flat black all over, except those six points. This is by far the lowest albedo of any body in the solar system, if that interests you. It's also the least dense. There's a strong possibility it's hollow, and a good chance it's not spherical. Possibly disc-shaped, or toroidal, like a donut. Either way, it seems to turn like a plate rolling along its edge, once every hour. That's enough spin so nothing could stay on its surface; the centripetal force would overpower the force of gravity."

"But if it's hollow, and you were on the *in*side . . ." Cirocco kept her eyes on Gaby.

"Inside, *if* it's hollow, it would be equivalent to a force of one-quarter gee."

Cirocco looked her next question, and Gaby couldn't meet her eyes.

"We're getting closer every day. The seeing can only get better. But I can't promise you when I could be sure about any of this."

Cirocco headed for the door. "I'll have to send what you have."

"But no theories, okay?" Gaby shouted after her. It was the first time Cirocco has seen her less than happy with what she'd seen through a telescope. "At least don't attribute them to me."

"No theories," Cirocco acknowledged. "The facts ought to be plenty."

CHAPTER TWO

Cirocco wondered if there was some threshold of isolation, or of insanity, and if so, if she had passed it. Things were making sense for longer periods of time. The concept of time itself almost seemed to make sense.

Her past returned to her in large chunks. They were jumbled, but the

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last few had been in some kind of order.

Sensation was returning to her arms and legs. It was still dark, but she could now hear a sound. It was her own heartbeat.

INFORMATIONAL DISPATCH #0931
(REPLY TO HOUSTON TRANSMISSION #5455, 5/20/25)
5/21/25
DSV RINGMASTER (NASA 447D, L5/1, HOUSTON-COPERNICUS GCR BASELINE)
JONES, CIROCCO, MISCOM
SECURITY INTERLOCK *ON*
CODE PREFIX DELTADELTA
BEGINS:

1. Concur your analysis of Themis as interstellar space vehicle of the generation type. Don't forget we suggested it first.

2. Latest photo follows. Note increased resolution of bright areas. Still no luck finding docking facilities at hub; will keep looking.

3. Concur your mid-course scheduled 5/22.

4. Request updated tracking as new orbital insertion is approached, beginning 5/25 and continuing until insertion commences, then upgraded. I don't care if this means shifting in another computer; I don't think our on-board will handle this volume.

5. Turnaround 5/22, 0400 UT, after the mid-course burn.

INFORMATIONAL ENDS
PERSONAL (CIRCULATION LIMITED TO RINGMASTER MISSION CONTROL COMMITTEE) BEGINS:

Re the Contact Committee which has been bending my ear: *buzz off!* I don't care WHO'S on the damn thing. I've been getting contradictory instructions that sound like they have the force of direct orders. Maybe you don't like my ideas of how to handle this, maybe you do. The fact is it's going to have to be my show. Time-lag alone is enough to make that necessary. You gave me the ship and the responsibility, so *GET OFF MY BACK!*
ENDS

Cirocco hit the ENCODE button, then TRANSMIT, and leaned back in her chair. She rubbed her eyes. A few days ago there had been too little to do. Now she was snowed under with the status check to ready *Ringmaster* for orbital insertion.

Everything was changed, and all by those six tiny points of light in Gaby's telescope. There seemed little sense in exploring the other Saturnian moons now. They were committed to an early rendezvous with Themis.

She called up the schedule of things still to be done, then the duty roster, saw it had been rearranged again. She was to join April and Calvin outside. She hurried to the lock.

Her suit was bulky and tight. It murmured at her while the radio hissed quietly. It smelled comfortably like herself, and like hospital plastic and fresh oxygen.

Ringmaster was an elongated structure consisting of two main sections joined by a hollow tube three meters in diameter and a hundred meters long. Structural strength for the tube

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was provided by three composite girders on the outside, each of which transmitted the thrust of one engine to the life system balanced on top of the tube.

At the far end were engines and a cluster of detachable fuel tanks, hidden from sight by the broad plate of the radiation shield which ringed the central tube like the rat guard on the mooring line of an ocean-going freighter. The other side of that shield was an unhealthy place to be.

On the other end of the tube was the life system, consisting of the science module, the control module, and the carousel.

Control was at the extreme front end, a cone-shaped protuberance rising from the big coffee can that was SCIMOD. It had the only windows on the ship, more for tradition than practicality.

The science module was almost hidden behind a thicket of instrumentation. The high-gain antenna rose above it all, perched on the end of a long stalk and trained on Earth. There were two radar dishes and five telescopes, including Gaby's 120-centimeter Newtonian.

Just behind it was the carousel: a fat, white flywheel. It rotated slowly around the rest of the ship, with four spokes leading up from the rim.

Strapped to the central stem were other items, including the hydroponics cylinders and the several components of the lander: life system, tug engine, two descent stages and the ascent engine.

The lander had been intended for exploring the Saturnian moons, in particular Iapetus and Rhea. After Titan—which had an atmosphere and was therefore unsuited for exploration this trip—Iapetus was the most interesting body in the neighborhood. Until the 1980s, it had been significantly brighter in one hemisphere, but it had changed over a twenty-year period until its albedo was nearly uniform. Two troughs in the graph of luminosity now occurred at opposite points on its orbit. The lander had been designed to discover what caused it.

Now that trip had been scrapped in the face of the much more compelling object called Themis.

Cirocco was EVA to remove the last of the solar reflection panels which wrapped the life system of *Ringmaster*. The problem in a space vehicle is usually one of disposing of excess heat, but they were now far enough from the sun that it paid to soak up what they could get.

She hooked a safety line around a pipe that went from the carousel hub to the airlock, and faced one of the last panels. It was silver, a meter square, made of two sheets of thin foil sandwiched together. She touched the screwdriver to one corner and the device clucked as it found the slot. The counterweight rotated. It gulped the loose screw before it could drift away.

Three more times and the panel floated away from the layer of antimeteorite foam beneath. Cirocco held it and turned to face the sun, conducting

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her own informal puncture survey. Three tiny, bright lights marked where the sheet had been hit by grains of meteoritic dust.

The panel was held rigid by wires along the edges. She bent two of these in the middle. After the fifth fold it was small enough to fit in the thigh pocket of her suit. She fastened the flap, then moved to the next panel.

Time was at a premium. Whenever possible they combined two chores, so the end of the ship's day found Cirocco reclining on her bunk while Calvin gave her a weekly physical and Gaby showed her the latest picture of Themis. The room was crowded.

"It's not a photo," Gaby was saying. "It's a computer-enhanced theoretical image. And it's in infrared, which seems to be the best spectrum."

Cirocco raised herself on one elbow, careful not to dislodge any of Calvin's electrodes. She chewed on the end of the thermometer until he frowned at her.

The print showed a fat wagon wheel surrounded by broad-based, bright red triangular areas. There were six red areas on the inside of the wheel, but they were smaller, and square.

"The big triangles on the outside are the hottest parts," Gaby said. "I figure they're part of the temperature control system. They soak up heat from the sun or bleed off the excess."

"Houston already decided that," Cirocco pointed out. She glanced at the television camera near the ceiling. Ground control was monitoring them. If they thought of something Cirocco would hear of it in a few hours, asleep or not.

The wheel analogy was almost literally true, except for the heating or cooling fins Gaby had indicated. There was a hub in the center, and it had a hole which could have taken an axle if Themis had actually been a wagon wheel. Radiating from the hub were six thick spokes which flared gradually just before joining the outer portion of the wheel. Between each pair of spokes was one of the bright, square areas.

"This is what's new," Gaby said. "Those squares are angled. They're what I originally saw; the six points of light. They're flat, or they'd scatter a lot more light. As it is they only reflect light to Earth if they're at just the right angle, and that's rare."

"What kind of angle?" Cirocco lisped. Calvin took the thermometer out of her mouth.

"Okay. Light comes in parallel to the axis, from *this* angle." She moved an extended finger toward the print. "The mirrors are set to deflect the light ninety degrees, into the wheel roof." She touched the paper with her finger, turned the finger, and indicated an area between two spokes.

"This part of the wheel is hotter than the rest, but not so hot that it could be soaking up all the heat it gets. It's not reflecting it or absorbing it, so it's transmitting it. It's transparent or translucent. It lets most of the light go through to whatever's underneath. Does that suggest anything to you?"

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Cirocco looked up from her careful examination.

"What do you mean?"

"Okay. We know the wheel is hollow. Maybe the spokes are, too. Anyway, picture the wheel. It's like a car tire, big and fat and flat on the bottom to give more living space. Centrifugal force pushes you away from the hub."

"I've got all that," Cirocco said, slightly amused. Gaby could be so intense when explaining something.

"Right. So when you're standing on the inside of the wheel, you're either under a spoke, or under a reflector, right?"

"Yeah? Oh, yeah. So—"

"So it's always either daytime or nighttime at any particular spot. The spokes are rigidly attached, the reflectors don't move, and neither can the skylights. So it *has* to be that way. Permanent day or permanent night. Why would they build it that way?"

"To answer that, we'd need to meet them. Their needs must be different from ours." She looked back at the picture. She had to keep reminding herself of the size of the thing. Thirteen hundred kilometers in diameter, four thousand around the outer rim. The prospect of meeting the beings who built such a thing was worrying her more each day.

"All right. I can wait." Gaby was not that interested in Themis as a spacecraft. To her it was a fascinating problem in observation.

Cirocco again looked at the pictures.

"The hub," she began, then bit her lip. That camera was still running, and she didn't want to say anything too hastily.

"What about it?"

"Well, it's the only place you could dock with the thing. The only part that's motionless."

"Not the way it is now. That hole in the middle is pretty big. The first time you reach anything solid, it's moving at a pretty good clip. I can calculate—"

"Never mind. It's not important right now. The point is, only at the dead center of rotation could you dock with Themis without a great deal of trouble. *I* sure wouldn't want to try it."

"So?"

"So there must be a compelling reason why there are no docking facilities visible there. Something important enough to sacrifice that location, some reason for leaving a big hole in the center."

"Engine," Calvin said. Cirocco glanced at him, got a glimpse of his brown eyes before he turned back to his work.

"That was my thought. A real big fusion ramscoop. The machinery is in the hub, electromagnetic field generators to funnel the interstellar hydrogen into the center, where it gets burned."

Gaby shrugged. "Makes sense. But what about docking?"

"Well, *leaving* the thing would be easy enough. Just drop out a hole in the bottom and get escape velocity for

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free, plus some to fool around with. But there ought to be some sort of dingus that would telescope out to the center of rotation when the engine isn't running, to pick up scout ships. The main engine *has* to be there. The only other way would be to space engines around the rim. I'd want three, at least. More would be better."

She turned to face the camera.

"Send me what you can about hydrogen ramscoop engines," she said. "See if you can give me some idea of what to look for if Themis has one."

"You'll have to take your shirt off," Calvin said.

Cirocco reached up and switched off the camera, leaving the sound on. Calvin thumped her back and listened to the results while Cirocco and Gaby continued to study the picture of Themis. They came up with no new insights until Gaby brought up the matter of the cables.

"As far as I can tell, they form a circle about midway between the hub and the rim. They support the top edges of the reflecting panels, sort of like the rigging on a sailing ship."

"What about these?" Cirocco said, indicating the area between two of the spokes. "Any idea what they're for?"

"Nope. There's six of them, and they run midway between the spokes, from the hub to the rim, radially. They pass through the reflecting panels, if that tells you anything."

"Not exactly. But if there's any more of these things, maybe smaller ones, we should look for them. These cables are about—what did you say? Three kilometers around?"

"More like five."

"Okay. So one that's just a tiny thing—say about as big around as *Ringmaster*—might be invisible to us for a long time, especially if it's as black as the rest of Themis. Gene's going to be nosing around there in the SEM. I'd hate for him to hit one."

"I'll get the computer on it," Gaby said.

Calvin began packing his equipment.

"As disgustingly healthy as usual," he said. "You people never give me a break. If I don't try out that five-million-dollar hospital how am I going to make them believe they got their money's worth?"

"You want me to break sombody's arm?" Cirocco suggested.

"Nah. I already did that, back in medical school."

"Broke one, or fixed it?"

Calvin laughed. "Appendix. Now *there's* something I'd like to try. You don't hardly get busted appendixes anymore."

"You mean you've never taken out an appendix? What do they teach you in medical school these days?"

"That if you get the theory right, the fingers will follow. We're too intellectual to get our hands dirty." He laughed again, and Cirocco could feel the thin walls of her room shaking.

"I wish I knew when he was serious," Gaby said.

"You want serious?" Calvin asked.

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"Here's something you might never have thought of. Elective surgery. You folks have one of the best surgeons around—" He paused to allow the rude noises to die away. "One of the best surgeons there is. Does anyone take advantage of it? Not hardly. A nose job, now that's going to cost you seven, eight thousand back home. Here you got it on the Blue Cross."

Cirocco drew herself up and gave him an icy glare.

"You couldn't be talking about *me*, could you?"

Calvin held out a thumb and sighted along it to Cirocco's face, squinting. "Of course, there's other types of elective surgery. I'm pretty good at all of them. It was my hobby." He moved his thumb lower. Cirocco aimed a kick at him and he ducked out the door.

CHAPTER THREE

Cirocco could move and breathe. It was a thick, almost jellied liquid that rippled through her nostrils; not unpleasant, not even frightening once she was used to it.

Her arms and legs were free of the paralysis or invisible restraints. She touched something with her hand, and felt something touch her. After a period of befuddlement, she put the two events together and knew she had touched herself.

She curled tight, licked and bit everything she could reach while her hands pinched and pulled. She was smooth and hairless, slick as an eel.

Then she felt it all going away again, and almost panicked. She was overwhelmed with memories flashing by in random order, so that she began to feel overloaded. She landed once more in the airplane in Alaska with the eerie silence all around her, just after the second engine had died. She saw again the tiny frozen lake, felt the shocking surge of passion to live, tasted blood as she lifted her face from the wrecked controls. She swirled back still farther to a sweaty day in Kentucky and the messy disappointment of her first time there on Ron's mother's good couch, heard the sound of her car in the driveway. Then she was in school in Japan, big and awkward even among the other whites—

Stop!

Desperately she held on to what she had gained before it was all snatched away from her again.

Name: Cirocco Jones. That was easy. She had a good grip on that now.

She was thirty-four years old. She was not black, but she wasn't white, either. She had been born by the side of the road near Mecca, nine months after the Ramadan Blitz. Her mother had been working as a civilian engineer when the Jihad recaptured the holy city. Her father was a guard who raped her mother in the prison camp. Cirocco had his brow, his nose, and his jet black hair.

She reviewed her life, there in the darkness. She wondered if it mattered if she got everything right. She hoped not, because she found gaps in her distant past.

But there were flashes that were

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more like reliving her life than like memories.

Like the arrival at Saturn.

From a ballistic standpoint, Themis was a nightmare.

No one had ever tried to orbit a toroidal body. Themis was thirteen hundred kilometers across and only two hundred fifty kilometers wide. The torus was flat along the outside, and one hundred seventy five kilometers from top to bottom. The density of the torus varied radically, supporting the view that it was composed of a thick floor along the outside, an atmosphere above that, and a thin canopy arching overhead holding the air inside.

Then there were the six spokes, four hundred twenty kilometers tall. They were elliptical in cross-section, with major and minor axes of one hundred kilometers and fifty kilometers, respectively, except near the base where they flared out to join the torus. In the center was the hub, more massive than the spokes, one hundred sixty kilometers in diameter, with a one hundred kilometer hole in the center.

Trying to cope with a body like that was tantamount to a nervous breakdown for the ship's computer, and for Bill, who had to make a model the computer would believe in.

The easiest orbit would have been in the equatorial plane of Saturn, enabling them to use the velocity they already had. But that was not possible. Themis was oriented with its axis of rotation parallel to the equatorial plane. Since the axis passed through the hole at the center of Themis, any Saturn-equatorial orbit Cirocco might assume would have *Ringmaster* passing through areas of wildly fluctuating gravitational attraction.

The only viable possibility was an orbit in the equatorial plane of Themis. Such an orbit would be expensive in terms of angular momentum. It had the single advantage of being stable, once achieved.

The maneuvering began before they reached Saturn. During the last day of approach their course was recalculated. Cirocco and Bill relied on Earth-based computers and navigational aids as far away as Mars and Jupiter. They lived in CONMOD and watched Saturn grow larger in the aft television screens.

Then the long burn was initiated.

During a lull in her work, Cirocco turned on the camera in SCIMOD. Gaby looked up with a harried expression.

"Rocky, can't you do something about that vibration?"

"Gaby, the engine function is, as they say, nominal. They're just going to shake, that's all."

"Best observing time of the whole damn *trip*," Gaby muttered. In the seat next to Cirocco, Bill laughed.

"Five minutes, Gaby," he said. "And I really think we ought to let them burn as long as we planned. It would work out so much nicer."

The engines shut down on the tick and they watched for final confirmation that they were where they wanted to be.

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"This is *Ringmaster*; C. Jones commanding. We have arrived in Saturn orbit at 1341.453 hours, Universal Time. I'll send up the prelims for a correcting burn when we come out from behind. Meanwhile, I'm going off this channel."

She slapped the appropriate switch.

"Anybody who wants to take a look outside, this is going to be your only chance."

It was tight, but August and April and Gene and Calvin managed to squeeze into the cramped room. After checking with Gaby, Cirocco turned the ship ninety degrees.

Saturn was a dark gray hole, seventeen degrees wide, covering one thousand times the area of the moon as seen from Earth. The rings were an incredible forty degrees from side to side.

They looked like solid, brilliant metal. *Ringmaster* had come in north of the equator, so the upper face was presented to them. Each particle was being lit from the opposite side, presenting a thin crescent, like Saturn. The sun was a brilliant point of light in the ten o'clock position, approaching Saturn.

Sunset lasted fifteen seconds. The colors were deep and changed rapidly, pure reds and yellows and blue-blacks like those seen from an airliner in the stratosphere.

There was a soft chorus of sighs in the cabin. The glass depolarized and everyone gasped again as the rings grew brighter, bracketing the deep blue glow that outlined the northern hemisphere. Gray striations became visible on the planetary surface, illuminated by ringlight. Down there were storms as big as the Earth.

When she looked away at last, Cirocco saw the screen to her left. Gaby was still in SCIMOD. There was an image of Saturn on the screen above her head, but she didn't look up at it.

"Gaby, don't you want to come up and see this?"

Cirocco saw her shake her head. She scanned the numbers marching across a tiny screen.

"And lose the best observing time of the whole trip? You've got to be out of your mind."

That was the first passage. Cirocco remembered it well, could call it up and relive it at will. It had been the high point of her career as an astronaut. It had made her think once again that all the work was worth it.

Themis had been a little different.

They first assumed a long, elliptical orbit with a low point two hundred kilometers above the theoretical radius of Themis. It was a mathematical abstraction because the orbit was tilted thirty degrees from Themis's equator, which put them above the dark side. They passed the spinning toroid to emerge on the sun side. Themis lay spread out before them as a naked-eye object.

Not that there was a lot to see. Themis was nearly as black as space, even with the sun shining on it. She studied the huge mass of the wheel

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with the triangular solar absorption sails rimming it like sharp gear teeth, presumably soaking up sunlight and turning it into heat.

The ship moved over the interior of the great wheel. The spokes became visible, and the solar reflectors. They seemed nearly as dark as the rest of Themis, except where they mirrored some of the brighter stars.

The problem that still worried Cirocco was the lack of an entrance. There was a lot of pressure from Earth to get into the thing, and Cirocco, despite her cautious instincts, wanted to as badly as anyone else.

There had to be a way. No one doubted Themis was an artifact. The debate concerned whether it was an interstellar space vehicle or an artificial world, like O'Neill One. The differences were movement and origin. A spaceship would have an engine, and it would be at the hub. A colony would have been built by somebody close at hand. Cirocco had heard theories that included inhabitants of Saturn or Titan, Martians—though no one had found so much as a flint arrowhead on Mars—and ancient spacefaring races from the Earth. She didn't believe any of them, but it hardly mattered. Ship or colony, Themis had been built by someone, and there would be a door.

The place to look was the hub, but the constraints of ballistics forced her to orbit as far from the hub as she could get.

Ringmaster settled into a circular orbit four hundred kilometers above the equator. They traveled in the direction of spin, but Themis turned faster than their orbital speed. It was a black plane outside Cirocco's window. At regular intervals one of the solar panels would sweep by like the wing of a monstrous bat.

Some details could now be seen on the outer surface. There were long, puckered ridges that converged on the solar panels, presumably covering huge pipes to carry a fluid or gas to be warmed by the sun. Scattered widely in the darkness were a few craters, some of them four hundred meters deep. There was no rubble scattered around them. Nothing could stay on the outer surface of Themis that wasn't fastened down.

Cirocco locked her control board. At her elbow, Bill nodded in his couch, asleep. The two of them had not left CONMOD in two days.

She moved through SCIMOD like a sleepwalker. Somewhere down there was a bed with soft sheets and a pillow, and a comfortable quarter gee now that the carousel was turning again.

"Rocky, we've got something strange here."

She stopped with one foot on the ladder of D Spoke, stood very still for a moment.

"What did you say?" The edge in her voice made Gaby look up.

"I'm tired, too," she said, irritably. She palmed a switch, and an image appeared on the overhead screen.

It was a view of the approaching edge of Themis. There was a swelling

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on it that seemed to grow larger as it caught up with them.

"That wasn't there before." Cirocco's brow furrowed as she tried to shake off the exhaustion.

A buzzer sounded faintly and for a moment she could not place it. Then things became sharp and clear as adrenalin ate the cobwebs. It was the radar alarm in CONMOD.

"Captain," Bill said over the speaker, "I've got a strange reading here. We're not getting closer to Themis, but something's getting closer to us."

"I'll be there." Her hands felt like ice as she grabbed a stanchion to swing herself up. She glanced at the screen. The object exploded. It looked like a starburst, and it was growing.

"I can see it now," Gaby said. "It's still attached to Themis. It's like a long arm or a boom, and it's opening out. I think—"

"The docking facilities!" Cirocco yelled. "They're gonna grab us! Bill, start the engine sequence, stop the carousel, get ready to move."

"But it'll take us thirty minutes—"

"I *know*. Move!"

She caromed off the viewport and into her seat, reached for her microphone.

"All hands. Emergency status. Depressurization alert. Evacuate the carousel. Acceleration stations. Strap *in*." She slammed the alarm button with her left hand and heard the eerie hooting begin in the room behind her. She glanced to her left.

"You too, Bill. Get suited."

"But—"

"Now! That's an order!"

He was out of his seat and diving through the access hatch. She turned and called over her shoulder.

"Bring my suit back with you!"

The object was visible out the window now, approaching fast. She had never felt so helpless. By overriding the attitude control system's programming she was able to fire all the thrusters on the side of the ship facing Themis, but it was not nearly enough. The great mass of *Ringmaster* barely moved. Other than that, she could only sit and monitor the automatic engine sequencing and count the seconds as they dragged by. In a short time she knew they could not escape. That thing was big, and moving faster.

Bill appeared, suited, and she scrambled into SCIMOD to don her own suit. Five anonymous figures sat belted to acceleration couches, not moving, staring at the screen. She clamped her helmet, and heard chaos.

"Quiet it down." The chatter died away. "I want silence on the suit channel unless I ask you to speak."

"But what's happening, Commander?" It was Calvin's voice.

"I said no talking. It looks like an automatic device is going to pick us up. This must be the docking facilities we were looking for."

"It looks more like an attack to me," August muttered.

"They must have done this before. They must know how to do it safely." She wished she could convince herself of that. It didn't help her credibility

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when the whole ship shuddered.

"Contact," Bill said. "It's got us."

Cirocco hurried back to her station, just in time to miss seeing the grapple sweep over them. The ship jumped again, and awful noises came from the rear.

"What did it look like?"

"Great big octopus tentacles without the suckers." He sounded shaken. "There were hundreds of them, waving around all over."

The ship gave an even greater lurch, and more alarms began to sound. Red lights spread like a firestorm across her controls.

"We've got a hull rupture," Cirocco said, with a calmness she did not feel. "Losing air from the central stem. Sealing off pressure doors 14 and 15." Her hands moved over the controls without conscious guidance. The lights and buttons were far away, seen through the wrong end of a telescope. The accelerometer dial began to spin as she was thrown violently forward, then to the side. She came to rest on top of Bill, then struggled back to her seat and strapped in.

When the buckle clicked around her waist the ship jerked backwards again, worse than before. Something came through the hatch behind her and lit the viewport, which developed a network of cracks.

She hung from her seat, her body straining forward against the belt. An oxygen cylinder flew through the hatch. The glass shattered and the sound of the impact was sucked away with the burst of cold, hard glass knives that turned and dwindled before her eyes. Everything in the cabin that wasn't tied down leaped up and hurtled through the mouth of jagged teeth that had once been a viewport.

Blood pulsed in her face as she hung above a bottomless black hole. Large objects turned lazily in the sunlight. One of them was the engine module of *Ringmaster,* out there in front of her where it had no right to be. She could see the broken stump of the connecting stem. Her ship was coming apart.

"Oh, shit," she said, then had a vivid recollection of a tape she had once heard from the flight recorder of an airliner. That had been the last word the pilot had uttered, seconds before impact, when he knew he was going to die. She knew it, too, and the thought filled her with a vast disgust.

She watched in dull horror as the thing that had the engines wrapped more tentacles around it. It reminded her of a Portuguese man-of-war with a fish snared in its poisonous grip. A fuel tank ruptured—soundlessly, with a strange beauty. Her world was coming apart with no noise to mark its passing. A cloud of compressed gas quickly dispersed. The thing did not seem to mind.

Other tentacles had other parts of the ship. The high-gain antenna almost seemed to be swimming away, but it moved too slowly as it tumbled down the well below her.

"Alive," she whispered. "It's alive."

"What did you say?" Bill was trying to hold himself secure with both

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hands on the instrument panel. He was strapped solidly to his chair, but the bolts which held it to the floor had broken.

The ship shuddered again, and Cirocco's chair came free. The edge of the panel caught her across the thighs and she cried out as she struggled to free herself.

"Rocky, things are falling apart in here." She wasn't sure whose voice it was, but the fear reached her. She pushed, and managed to open her seat belt with one hand while holding herself away from the panel with the other. She slipped out to the side and saw her chair bounce across the shattered array of dials, stick briefly in the frame of the broken port, and launch into space.

She thought her legs were broken, but found she could move them. The pain lessened as she drew on reserves of strength to help Bill out of his chair. Too late, she saw that his eyes were closed, his forehead and the inside of his helmet smeared with blood. As his body slithered loosely over the control panel she saw the dent his helmet had made in it. She fought for a grip on his thigh, then his calf, his booted foot, and he was falling, falling in the middle of a glittering shower of glass.

She came to her senses crouched in the leg well under the control panel. She shook her head, unable to recall what had put her there. But the force of deceleration was not so great now. Themis had succeeded in bringing *Ringmaster*—or what was left of it—up to its own rotational speed.

No one was talking. A hurricane of breathing came through the speaker in her helmet, but no words. There was nothing to say; the screams and curses had exhausted themselves. She got to her feet, grabbed the edge of the hatchway above her, and pulled herself through into chaos.

No lights worked, but sunlight spilled harshly across broken equipment from a large rip in the wall. Cirocco moved through the debris and a suited figure got out of her way. Her head throbbed. One of her eyes was swollen shut.

There was a lot of damage. It would take a while to get it cleaned up so they could get underweigh.

"I'll want a complete damage report from all departments," she said, to no one in particular. "This ship was never meant for that kind of treatment."

Only three people were standing. One figure knelt in the corner, holding the hand of another who was buried in wreckage.

"I can't move my legs. I can't move them."

"Who said that?" Cirocco shouted, trying to make the dizziness go away by shaking her head, succeeding only in making it worse.

"Calvin, attend to the injuries while I see what can be done for the ship."

"Yes, Captain."

No one moved, and Cirocco wondered why. They were all watching her. Why were they doing that?

"I'll be in my cabin if you need me. I'm not . . . not feeling so good."

One of the suits took a step toward

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her. She moved, trying to avoid the figure, and her foot went through the deck. Pain shot through her leg.

"It's coming in, over there. See? It's after *us* now."

"Where?"

"I don't see anything. Oh, God. I see it."

"Who said that? I want silence on this channel!"

"Look out! It's behind you!"

"Who said that?" She broke out in a sweat. Something was creeping up behind her, she could feel it, and it was one of those things that only come out into your bedroom after you switch off the light. Not a rat, but something worse that had no face but only a patch of slime and cold, dead, clammy hands. She groped in the red darkness and saw a writhing snake dart through a patch of sunlight in front of her.

It was so quiet. Why didn't they make any noise?

Her hand closed around something hard. She lifted it and began to chop, up and down, over and over as the thing flashed into view.

It wouldn't die. Something wrapped around her waist and started to pull her forward.

The suited figures jumped and ran around in the small space, but the tentacles shot out strings which stuck like hot tar. The room was laced with them, and something had Cirocco by the legs and was trying to pull her apart like a wishbone. There was a pain like she had never felt before, but she continued to chop at the tentacle until awareness slipped from her.

CHAPTER FOUR

She was in the belly of the beast.

She had known it all the time, but it wasn't a pleasant thing to admit so she had not told herself, hoping to keep it a secret. But the truth will out.

She was in the belly, and she was going crazy. Strike that, she thought. She had already been crazy and had come back from it. Possibly a dozen times. She would be crazy again if something didn't happen soon.

Eventually, something did. She began to move, and the walls began to close in on her.

There was no way to tell if the walls had been there all along. She could feel them now when she reached out through the sluggish liquid. They were soft, and uneven. She was being propelled slowly through a narrowing tube.

She lodged, headfirst. The tunnel began to contract.

She felt claustrophobic for the first time. Tight spaces had never bothered her before.

The walls pulsed and rippled, moving her forward until her head slipped through into coolness and a rough texture. Another squeeze; fluid was forced from her lungs and she coughed, inhaled, found her mouth filled with grit. She coughed again and more fluid came out, but by now her shoulders were free and she was able to duck her head in the darkness and avoid getting another mouthful. She wheezed and spit, and began to breathe from her nose.

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Her arms came free, then her hips, and she began to dig at the spongy material that enclosed her. It smelled like a childhood day spent in the cool, bare earth basement beneath her mother's house in Kentucky; like nine years old and digging in the dirt.

One leg came free, then the other, and she had to stop to rest with her head bent into the air pocket formed by her arms and chest. Her breath came in wet spasms.

Dirt crumbled behind her neck and rolled down her body until it nearly filled her air space. She was buried, but she was alive. It was time to dig, but she could not use her arms.

Fighting down panic, she tried to force herself up with her legs. She felt her thigh muscles knotting.

Her head broke through into air and light. Gasping, spitting, she got one arm out of the ground, then the other, and clawed at what felt like cool grass. She crawled from the hole on hands and knees and finally collapsed. She dug her fingers into the blessed ground and cried herself to sleep.

She didn't want to wake up. She fought it for a long time, pretending that she was asleep. When she felt the grass fading away and the darkness coming back, she opened her eyes quickly.

A few centimeters from her nose was a pale green carpet that looked like grass. It smelled like it, too. It was the kind of grass found only on the greens of the better golf courses. But it was warmer than the air, and Cirocco couldn't account for that. Perhaps it wasn't grass at all.

She rubbed her hand over it and sniffed again. Call it grass.

She sat up and something clanked, distracting her. There was a gleaming circular metal band around her neck, and other, smaller ones on her arms and legs. The big one had many strange objects dangling from it, held together by wire. She slipped it off and wondered where she had seen it before.

It was amazingly difficult to concentrate. The thing in her hands was so complex, so various; too much for her scattered wits.

It was her pressure suit, stripped of all the plastic and rubber seals. Most of her suit had been plastic. Nothing remained but the metal.

She made a pile of the parts, and in the process, realized just how naked she was. Beneath a coating of dirt her body was completely hairless. Even her eyebrows were gone.

She put her face in her hands and began to cry.

Cirocco did not cry easily, nor often. She was not good at it. But after a very long time, she thought she knew who she was again.

Now it was time to find out where she was.

It might have been a half hour later that she felt ready to move. And just that decision was enough to spawn a dozen questions. Move, but to where?

She had intended to explore Them-

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is, but that was when she had a spaceship and all the resources of the best technology on Earth. Now she had her bare skin and a few bits of metal.

She was in a forest that was composed of grass and one species of tree. She called them trees by the same reasoning she had used on the grass. If it's seventy meters tall, has a brown, round trunk, and what looks like leaves far above, then it's a tree. Which did not mean it might not cheerfully eat her if given the chance.

She had to get the worries down to a manageable level. Rule out the things you can do nothing about, don't fret too much about the ones you can do little about. And remember that if you're as cautious as sanity would seem to dictate you'll starve to death in a cave.

The air was in the first category. It could contain a poison.

"So stop breathing, at once!" she said, aloud. Right. At least it smelled fresh, and she was not coughing.

Water was something she could do little about. Eventually she would have to drink some, assuming she could find it—which she decided should go right to the top of her list. When she found it, perhaps she could make a fire and boil it. If not, she would drink it, microscopic bugs and all.

And then there was food, which actually worried her more than anything. Even if there was nothing around that wanted to make a meal of her, there was no way of knowing if the food she ate would poison her. Or it might be no more nourishing than cellophane.

She examined the hole she had emerged from.

It was a raw brown wound in the neat expanse of grass. Patches of sod, held together by a feathery root structure, lay upside-down around it. The hole itself was only half a meter deep; the sides had crumbled to fill the rest.

"Something tried to eat me," she said. "Something ate all the organic parts of my suit, and all my hair, then excreted the junk right here. Including me." She noted in passing that she was glad the thing had classified her as junk.

It was a hell of a beast. They knew the outer part of the torus—the ground she was sitting on—was thirty kilometers thick. This thing was large enough to snag *Ringmaster* while the ship orbited four hundred kilometers away. She had spent a long time in its belly and for some reason had proved indigestible. It had burrowed through the ground to this point, and expelled her.

And that just didn't make sense. If it could eat plastic, why couldn't it eat her? Were ship's captains too tough?

It had eaten her whole *ship*, pieces as large as the engine module, others just tiny bits of glass or tumbling, dwindling spacesuited figures with dented helmets . . .

"Bill!" She was on her feet, every muscle in her body straining. "Bill! I'm *here*. I'm alive! Where are you?"

She slapped her forehead with her

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hand. If only she could get through this muddy-headed feeling when thoughts were coming so slowly. She had not forgotten about the crew, but it was not until that moment that she connected them with the newborn Cirocco standing naked and hairless on the warm ground.

"Bill!" she shouted again. She listened, then collapsed with her legs folded under her. She plucked at the grass.

Think it through. Presumably, the creature would have treated him as another piece of debris. But he had been injured.

So had she, now that she thought of it. She examined her thighs and found not even a bruise. It told her nothing. She might have been inside the creature for five years, or only a few months.

Any of the others might arrive and be pushed out of the ground at any time. Somewhere down there, about a meter and a half deep, was some kind of excretory outlet for the creature. If she waited, and if the creature didn't like the taste of all humans and not just ones named Cirocco, they might all get together again.

She sat down to wait for them.

Half an hour later (or was it only ten minutes?) it didn't make sense. The creature was *big*. It had eaten *Ringmaster* like an after-dinner mint. It must extend through a great part of the underworld of Themis, and it didn't make sense to think this one orifice could handle all the traffic. There could be others, and they could be scattered all over the countryside.

A little later she had another thought. They were coming far apart, but they were coming, and she was grateful for that. The thought was simple: she was thirsty, she was hungry, and she was filthy. What she wanted most in the world was water.

The land sloped gently. She was willing to bet there would be a stream down there somewhere.

She stood and poked at the pile of metal pieces with one foot. There was too much to carry, but the junk was all she had for tools. She took one of the smaller rings, then picked up the larger one which had been the bottom of her helmet and was still connected to the dangling electronic components.

It wasn't much, but it would have to do. She slung the large ring over her shoulder and started down the hill.

The pool was fed by a two-meter fall from a rocky stream which wound through a little valley. The huge trees arched overhead, completely blocking her view of the sky. She stood on a rock near the edge of the pool, trying to judge its depth, thinking about jumping in.

Thinking about it was all she did. The water was clear, but there was no telling what might be in there. She jumped over the ridge which produced the waterfall. It was easy in the one-quarter gee. A short walk brought her to a sandy beach.

The water was warm, sweet, and bubbly, and easily the best thing she

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had ever tasted. She drank all she wanted, then squatted and scrubbed with sand, keeping an eye open. Watering holes were places for caution. When she was through she felt reasonably human for the first time since her awakening. She sat on the wet sand and let her feet trail in the water.

Moving on seemed to be the next order of business, but which way? Straight ahead could be ruled out. Across the stream the ground began to rise again. Downstream would be easiest, and should bring her to flatlands soon.

"Decisions, decisions," she muttered.

She looked at the tangle of metal junk she had been carrying all . . . what was it? Afternoon? Morning? Time could not be measured that way in here. It was possible to speak only of elapsed time, and she had no idea how much had gone by.

The helmet ring was still in her hand. Now her brow furrowed as she looked closer.

Her suit had once contained a radio. Of course it was not possible that it had come through the ordeal intact, but just for the hell of it she hunted for and found the remains. There was a tiny battery, and what was left of a switch, turned on. That ended that. Most of the radio had been silicon chips and metal, so there had been some faint hope.

She looked again. Where was the speaker? It should be a little metal horn, the remains of a headset unit. She found it, and lifted it to her ear.

". . . fifty-*eight*, fifty-*nine*, ninety-three-*sixty* . . ."

"Gaby!" She was on her feet, shouting, but the familiar voice kept counting, oblivious. Cirocco knelt on the rock and arrayed the remains of her helmet on it with fingers that trembled, holding the speaker to one ear while pawing through the components. She found the pinhead throat mike.

"Gaby, Gaby, come in please. Can you hear me?"

". . . eighty—Rocky! Is that you, Rocky?"

"It's me. where . . . where are . . ." She calmed down deliberately, swallowed, and went on. "Are you all right? Have you seen the others?"

"Oh, *Captain.* The most horrible things . . ." Her voice broke, and Cirocco heard sobs. Gaby poured out an incoherent stream of words: how glad she was to hear Cirocco's voice, how lonely she had been, how sure she had been that she was the only survivor until she listened to her radio and heard sounds.

"Sounds?"

"Yes, there's at least one other alive, unless that was you crying."

"I . . . hell, I cried quite a bit. It might have been me."

"I don't think so," Gaby said. "I'm pretty sure it's Gene. He sings sometimes, too. Rocky, it's so *good* to hear your voice."

"I know. It's good to hear yours." She had to take another deep breath and relax her grip on the helmet ring. Gaby's voice was back in control, but

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Cirocco was on the edge of hysterics. She didn't like the feeling.

"The things that have *happened* to me," Gaby was saying. "I was dead, Captain, and in heaven, and I'm not even religious, but there I was—"

"Gaby, settle down. Get a grip on yourself."

There was silence, punctuated by sniffs.

"I think I'll be all right now. Sorry."

"It's all right. If you went through anything like what I did, I understand perfectly. Now, where are you?"

There was a pause, then a giggle. "There're no street signs in the neighborhood," Gaby said. "It's a canyon, not very deep. It's full of rocks and there's a stream down the middle. There're these funny trees on both sides of the stream."

"It sounds pretty much like where I am." But which canyon? She wondered. "Which way are you going? Were you counting steps?"

"Yeah. Downstream. If I could get out of this forest, I could see half of Themis."

"I thought of that, too."

"We just need a couple landmarks to tell if we're in the same neighborhood."

"But I thought we must be, or we wouldn't be able to hear each other."

Gaby didn't say anything, and Cirocco saw her mistake.

"Right," she said. "Line of sight."

"Check. These radios are good for quite a distance. In here, the horizon curves *up*."

"I'd believe it better if I could see it. Where I am right now could be the enchanted forest at Disney World in late evening."

"Disney would have done a better job," Gaby said. "It would have had more detail, and monsters popping out of the trees."

"Don't say that. Have you seen anything like that?"

"A couple insects, I guess they were."

"I saw a school of tiny fish. They looked like fish. Oh, by the way, don't go in the water. They might be dangerous."

"I saw them. *After* I was in the water. But they didn't do anything."

"Have you passed anything that's remarkable in any way? Some unusual surface feature?"

"A few waterfalls. Two fallen trees."

Cirocco looked around and described the pool and waterfall. Gaby said she had passed several places like that. It might be the same stream, but there was no way to know.

"All right," Cirocco said. "Here's what we do. When you find a rock facing upstream, make a mark on it."

"How?"

"With another rock." She found one the size of her fist and attacked the rock she had been sitting on. She scratched a large "C" on it. There could be no mistaking its artificiality.

"I'm doing that now."

"Make a mark every hundred meters or so. If we're on the same river one of us will come up behind the

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other, and the one in front can wait for the other to catch up."

"Sounds good. Uh, Rocky, how long are these batteries good for?"

Cirocco grimaced, and rubbed her forehead.

"Maybe a month of use. It could depend on how long we were . . . you know, how long we were inside. I don't have any ideas on that. Do you?"

"No. Do you have any hair?"

"Not a strand." She rubbed her hand over her scalp, and noticed that it did not feel quite as smooth. "But it's growing back in."

Cirocco walked downstream, holding the speaker and mike in place so they could talk to each other.

"I feel hungriest when I think about it," Gaby said. "And I'm thinking about it right now. Have you seen any of these little berry bushes?"

Cirocco looked around but didn't spot anything like that.

"The berries are yellow, and about as big as the end of your thumb. I'm holding one now. It's soft and translucent."

"Are you going to eat it?"

There was a pause. "I was going to ask you about that."

"We'll have to try something sooner or later. Maybe one won't be enough to kill you."

"Just make me sick," Gaby laughed. "This one broke on my teeth. There's a thick jelly inside, like honey with a minty taste. It's dissolving in my mouth . . . and now it's gone. The rind is not so sweet, but I'm going to eat it anyway. It might be the only part with any food value."

If even that, Cirocco thought. There was no reason why any part of it should sustain them. She was pleased that Gaby had given her such a detailed description of her sensations while eating the berry, but she knew the purpose of it. Bomb defusing teams used the same technique. One stayed away while the other reported every action over the radio. If the bomb went off, the survivor learned something for the next time.

When they judged enough time had passed with no ill effect, Gaby began eating more of the berries. In time, Cirocco found some. They were almost as good as that first taste of water had been.

"Gaby, I'm about dead on my feet. I wonder how long we've been awake?"

There was a long pause, and she had to call again.

"Hm? Oh, hi. How did I get here?" She sounded slightly drunk.

Cirocco frowned. "Where's here? Gaby, what's happening?"

"I sat down for a minute to rest my legs. I must have fallen asleep."

"Try to wake up enough to find a good place for it." Cirocco was already looking around. It was going to be a problem. Nothing looked good, and she knew it was the worst possible idea to lie down alone in strange country. The only thing worse would be trying to stay awake any longer.

She went a short distance into the

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trees, and marveled at how soft the grass felt under her bare feet. So much better than the rocks. It would be nice to sit down in it for a minute.

She awoke on the grass, sat up quickly and looked all around. Nothing was moving.

For a meter in every direction from where she had slept, the grass had turned brown, dried out like hay.

She stood and looked down at a large rock. She had approached it from the downstream side while looking for a place to sleep. Now she walked around it, and on the other side was a large letter "G."

Gaby insisted on turning back. Cirocco didn't protest; it sounded good to her, though she could never have suggested it.

She walked downstream, often passing the marks Gaby had made. At one point she had to leave the sandy shore and go up onto the grass to avoid a large pile of boulders. When she reached the grass she saw a series of oval brown spots spaced like footprints. She knelt and touched them. They were dry and brittle, just like the grass where she had slept.

"I've found part of your trail," she told Gaby. "Your feet couldn't have touched the grass more than a second, and yet something in your body killed it."

"I saw the same thing when I woke up," Gaby said. "What do you think of it?"

"I think we secrete something that's poison to the grass. If that's true, we might not smell very good to the kind of large animals that might normally take an interest in us."

"That's good news."

"The bad part is that it might mean we have very different sorts of biochemicals. That's not so good for eating."

"You're so much fun to talk to."

"Is that you up ahead?"

Cirocco squinted into the pale yellow light. The river ran straight for a good distance, and just where it started to bend was a tiny figure.

"Yep. It's me, if that's you waving your arms."

Gaby whooped, a painful sound in the tiny earphone. Cirocco heard the sound again a second later, much fainter. She grinned, and then felt the grin getting bigger and bigger. She hadn't wanted to run, it was so like a bad movie, but she was running anyway and so was Gaby, taking absurdly long hops in the low gravity.

They hit so hard they were both breathless for a moment. Cirocco embraced the smaller woman and lifted her off her feet.

"D-d-d-damn, you look s-s-so *good*!" Gaby said. One of her eyelids was twitching, and her teeth chattered.

"Hey, hold on, take it easy," Cirocco soothed, rubbing Gaby's back with both hands. Gaby's smile was so wide it hurt to look at it.

"I'm sorry, but I think I'm going to be hysterical. Isn't that a laugh?" And

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she did laugh, but it was flat and hurt the ear, and before long turned into shudders and gasps. She held Cirocco strongly enough to break ribs. Cirocco didn't fight it, but eased her down to the sandy river bank and held her close while huge, low-gravity tears dripped onto her shoulders.

"Are you all right now?"

Gaby nodded. Her eyes were still bright, but she was smiling.

"Uh-huh. Probably not permanently, though. I woke up screaming. I'm really afraid to go to sleep."

"It's not my favorite thing, either. You know you're about the funniest-looking critter I ever saw?"

"That's because you don't have a mirror."

Gaby couldn't stop talking for hours, and she didn't like it when Cirocco let go of her. They moved to a less exposed position up in the trees, then sat with Cirocco's back against a trunk and Gaby reclining against her.

She spoke of her trip down the river, but what she kept wanting to go back to, or what she couldn't get away from, was her experience in the belly of the creature. It sounded to Cirocco like an extended dream that had little in common with what she herself had experienced, but that might have been just the inadequacy of words.

"I did wake up in the darkness a few times, like you did," Gaby said. "When I did, I couldn't feel or see or hear anything, and I didn't really want to stay there very long."

"I kept going back to my earlier life. It was extremely vivid. I could . . . *feel* it all."

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"Me, too," Gaby said. "But it wasn't a repeat. It was all new things."

"Did you always know who you were? That was the worst part for me, remembering and then forgetting. I don't know how many times that happened."

"Yeah, I always knew who I was. But I got to be pretty tired of being me, if that makes any sense. The possibilities were so *limited*."

"What do you mean by that?"

Gaby moved her hands indecisively, trying to pull something out of the air. "I was in there for twenty or thirty years," Gaby said quietly. "And don't try to tell me that's impossible. I've got a pretty good idea that nothing like that amount of time passed in the rest of the universe. I'm not crazy."

"I didn't say you were." Cirocco rubbed her shoulders when Gaby began to tremble, and it subsided.

"Well, I shouldn't have said I'm *not* crazy, either. I never had to have somebody baby me so I wouldn't cry before. I'm sorry."

"I don't mind," Cirocco murmured. "Gaby, there's no way either one of us could have come through that without some twitches. I cried for hours. I threw up. I may do it again, and if I can't help myself, I'd like for you to take care of me."

"I will, don't you worry about that." She seemed to relax a little more. She was quiet for a while and Cirocco thought she had gone to sleep, but it was not so.

"I had time to take a good look at myself," Gaby said, slurring her words. "I didn't like it. I got to wondering what I was doing with myself. It never bothered me before."

"What's wrong with the way you were?" Cirocco asked. "I kind of liked you."

"You did? I don't see how. Sure, I didn't cause a lot of trouble to anybody, I could take care of myself. But what else? What *good*?"

"You were very good at your job. That's all I really demanded of you. You're the very best there is, or you wouldn't have been picked for this mission."

Gaby sighed. "Somehow, that doesn't impress me. I mean, to *get* that good I sacrificed just about everything that makes a human being. Like I said, I did some real soul-searching."

"What did you decide?"

"For one thing, I'm through with astronomy."

"Gaby!"

"It's the truth. And what the hell? We'll never get out of here, and there're no stars to look at. I'd have needed to find something else to do anyway. And it's not that sudden. I had a long, *long* time to change my mind. You know, I don't have one lover in the whole world? Not even one friend."

"I'm your friend."

"No. Not the way I'm talking about. People respected me for my work, men desired me for my body. But I never made any friends, even as a kid. Not the kind you can open your heart to."

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"It's not that hard."

"I hope not. Because I'm going to be a different person. I'm going to tell people about the real me. This is the first time I can do it, because it's the first time I've really known myself. And I'm going to love. I'm going to care about people. And it looks like you're it." She raised her head and smiled at Cirocco.

"What do you mean?" Cirocco asked, frowning slightly.

"It's a funny feeling, and I knew it as soon as I saw you." She rested her head again. "I think I love you."

Cirocco could not say anything for a time, then forced a laugh.

"Hey, honey, you're still in that Hollywood heaven. There's no such thing as love at first sight. It takes time. Gaby?"

She tried several times to talk to her, but she was either asleep or faking it very well. She let her head fall back wearily.

"Oh, my God."

CHAPTER FIVE

The smart thing would have been to post watches. Cirocco wondered as she struggled to wakefulness why she had so seldom managed to do the smart thing since she got to Themis. They would have to adjust to the strange timelessness. They couldn't go on walking until they dropped.

Gaby was sleeping with her thumb in her mouth. Cirocco tried to get up without disturbing her, but it wasn't possible. She moaned, then opened her eyes.

"Are you as hungry as I am?" she yawned.

"That's hard to say."

"You think it's the berries? Maybe they're no good."

"Impossible to tell so soon. But take a look over there. That might be breakfast."

Gaby looked where Cirocco pointed. There was an animal down by the stream, drinking. As they watched, it raised its head and looked at them from no more than twenty meters away. Cirocco tensed, ready for anything. It blinked, and lowered its head.

"A six-legged kangaroo," Gaby said. "With no ears."

It was a fair description. The animal was covered with short fur and had two large hind legs, though not as large as a kangaroo's. The four front legs were smaller. The fur was light green and yellow. It was not taking any special care to protect itself.

"I'd like to get a look at its teeth. It might tell us something."

"The smart thing is probably to get the hell out of here," Gaby said. She sighed, and looked around on the ground. She got up before Cirocco could stop her, and was walking toward the creature.

"Gaby, stop it," Cirocco hissed, trying not to alert the animal. She saw now that Gaby had a rock in her hand.

The creature looked up again. It had a face that would have been hilarious in other circumstances. The head was round, with no visible ears or nose—

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just two big soft eyes. But the mouth looked as if the creature was chewing on a bass harmonica. It stretched twice as wide as the rest of the head, giving the animal a foolish grin.

It lifted all four front feet from the ground and bounded three meters in the air. Gaby jumped just about as high in surprise, and had time to twist wildly in the air before coming down on her buttocks. Cirocco reached her and tried to take the rock away.

"Come on, Gaby, we don't need meat that badly."

"Be quiet," Gaby said through clenched teeth. "I'm doing this for you, too." She wrenched her arm away and ran forward.

The thing had taken two leaps, but each had been good for eight or nine meters. Now it stood quietly, forelegs touching the ground, head lowered. It was eating the grass.

It looked up placidly as Gaby stopped two meters away. It seemed to have no fear of her, and resumed cropping as Cirocco came up behind Gaby.

"Do you think we should—"

"Hush!" Gaby hesitated only a moment longer, then stepped up to the beast. She raised her arm and brought the rock down hard on the top of its head, then jumped away.

The beast made a coughing noise, staggered, and fell on its side. It kicked once, and was still.

They watched it for a while, then Gaby walked over and prodded it with a toe. Nothing happened, so she went down on one knee beside it. It was no larger than a small deer. Cirocco squatted, elbows on her knees, trying not to feel disgusted by it. Gaby seemed short of breath.

"Do you think it's dead?" she asked.

"Looks like it. Kind of anticlimactic, don't you think?"

"It's okay with me."

Gaby wiped a hand across her forehead, then smacked the rock repeatedly into the creature's head until red blood flowed. Cirocco winced. Gaby dropped the rock and wiped her hands on her thighs.

"That's that. You know, if you could gather up some of that dry underbrush I think I might be able to make a fire."

"How're you going to do that?"

"Never mind. Just get the wood."

Cirocco had half an armload of it before she stopped to wonder when Gaby started giving the orders.

"Well, the theory was good," Gaby said, gloomily.

Cirocco tore again at the stringy red meat that clung so tenaciously to the bone.

Gaby had sweated for an hour with a piece of her spacesuit and a rock she had hoped was flint but which proved not to be. They had a pile of dry wood, a fine mosslike substance, and splinters carefully shaved from tree branches with the sharp edge of Cirocco's helmet. They had all the essential ingredients of fire except the spark.

In that hour Cirocco's opinion of Gaby's kill had undergone a revolu-

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tion. By the time she had it skinned and Gaby had given up on the fire she knew she would eat it raw and be thankful for it.

"That thing didn't have any predators," Cirocco said, around a mouthful. The meat was better than she had expected, but could have used some salt.

"It sure didn't act like it," Gaby agreed. She squatted on the other side of the carcass and her eyes roamed the ground over Cirocco's shoulder. Cirocco was doing the same thing.

"That could mean no predators big enough to bother us."

"I sure wouldn't want to tackle anything much bigger than that with just a rock and my bare hands."

They saw more of the kangaroo creatures, both singly and in groups of three or six. There were other, smaller animals that moved up and down the tree trunks almost too fast to see, and still more that stayed close to the water's edge. None of them were hard to approach. The tree animals, when they held still long enough to examine, didn't seem to have heads. They were blue balls of short fur with six clawed feet sticking out around the edges, and they moved in any direction with equal ease. The mouth was on the underside, centered in a star of legs.

The countryside began to change. Not only did they see more animals, but there were more varieties of plant life. They plodded on through light that was turned pale green by the forest canopy, one hundred thousand steps to the twenty-four-hour day. Unfortunately, they soon lost count. The huge, simplified trees gave way to a hundred different species, and a thousand kinds of flowering shrubs, trailing vines, and parasitic growths. The only things that remained constant were the stream that was their only guide, and the tendency of Themis trees to be gigantic. Any one of them would have rated a plaque and a tourist turnout in Sequoia National Park.

It was no longer quiet, either. During their first day of travel Cirocco and Gaby had only the sounds of their own footsteps and the clatter of their salvaged suits to keep them company. Now the forest twittered and barked and yammered at them.

The meat tasted better than ever when they stopped for a rest. Cirocco wolfed it down, sitting back to back with Gaby beside the gnarled trunk of a tree that was warmer than any tree should have been, with soft bark and roots that knotted into burls bigger than houses. Its upper branches were lost in the incredible tangle overhead.

"I'll bet there's more life in those trees than there is on the ground," Cirocco said.

"Look up there," Gaby said. "I'd say somebody wove those vines together. You can see water leaking out the bottom."

"We ought to talk about that. What about intelligent life in here? How would we recognize it? That's one of the reasons I tried to stop you from killing this animal."

Gaby munched thoughtfully.

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"Should I have tried to talk to it first?"

"I know, I know. I was more afraid it would turn around and bite your legs off. But now that we know how unaggressive it is, maybe we ought to do just that. Try to talk to one."

"How stupid, you mean. That thing didn't have half the brain of a cow. You could see that in its eyes."

"You're probably right."

"No, *you're* right. I mean, I'm right, but you're right that we should be more careful. I'd hate to eat something I ought to be talking to. Hey, what was that?"

It wasn't a noise, but the realization that noise had ceased. Only the splash of water and the high hiss of leaves disturbed the silence. Then, building so quietly and so slowly that they had been hearing it for minutes before they could identify it, came a vast moan.

God might moan like that, if he had lost everything he had ever loved, and if he had a throat like an organ pipe a thousand kilometers long. It continued to build on a note that somehow managed to rise without ever straying from the uttermost lower limits of human hearing. They felt it in their bowels and behind their eyeballs.

It already seemed to fill the universe, and yet still it got louder. It was joined by the sound of a string section: cellos and electronic basses. Treading lightly on top of this massive tonal floor were supersonic hissing overtones. The ensemble grew louder when it was not possible that it could grow louder than it already was.

Cirocco thought her skull would shatter. She was dimly aware of Gaby hugging her. They stared slack-jawed as they were showered by dead leaves from the vault overhead. Tiny animals fell, twisting and bouncing. The ground began to throb in sympathy. It yearned to fly apart and hurl itself into the air. A dust-devil skittered indecisively, then dashed itself to pieces on the bones of the tree where they huddled. They were lashed with debris.

There was crashing above them, and a wind began to reach down to the forest floor. A massive branch embedded itself in the middle of the stream. By then the forest was swaying, creaking, protesting: gunshots, and nails wrenched from dry wood.

The violence reached a plateau and stayed at that level. The winds seemed to be about sixty kilometers per hour. Higher up it sounded much worse. They stayed low in the protection of the tree roots and watched the storm rage around them.

Cirocco had to shout to be heard above the bass moaning.

"What do you suppose could cause it to come up so fast?"

"I have no idea," Gaby yelled back. "Local heating or cooling, a big change in the air pressure. I don't know what would cause that, though."

"I think the worst is over. Hey, your teeth are chattering."

"I'm not scared anymore. I'm *cold*."

Cirocco was feeling it, too. The

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temperature was plunging. In just a few minutes it had gone from balmy to chilly, and now she judged it was getting down around zero. With the wind coming at sixty klicks, it was no laughing matter. They huddled together, but she could feel the heat being sucked from her back.

"We've got to get to some kind of shelter," she yelled.

"Yeah, but what?"

Neither of them wanted to move from what little shelter they had. They tried covering each other with dirt and dead leaves, but the wind blew it away.

When they were sure they would freeze to death, the wind stopped. It did not diminish; it stopped dead, and Cirocco's ears popped so hard it hurt. She could not hear until she forced a yawn.

"Wow. I've heard of pressure changes, but nothing like that."

The forest was quiet again. Then Cirocco found that if she listened carefully she could hear the dying ghost of whatever had made the moaning sound. It made her shiver in a way that had nothing to do with the cold. She had never thought of herself as imaginative, but the moan had sounded so human, though on such a mighty scale. It made her want to lie down and die.

"Don't go to sleep, Rocky. We've got something else."

"What now?" She opened her eyes and saw a fine white powder drifting through the air. It sparkled in the pale light.

"I'd call it snow."

They went as fast as they could to keep their feet from getting numb, and Cirocco knew it was only the still air that saved them. It was cold; even the ground was cold for a change. Cirocco felt drugged. It could not be possible. She was a spaceship captain; how had she ended up trudging through a snowstorm in her bare skin?

But the snow was transitory. At one point it was a few centimeters deep on the ground, but then the heat began to well up from below and it melted quickly. Soon the air was getting warmer. When they felt it was safe, they found a place on the warm ground and went to sleep.

The stream, their guide for the whole journey so far, vanished in a large hole at the base of a hill.

The two of them stood on the edge of the hole and looked down. It gurgled like the drain of a bathtub, but at long intervals made a sucking sound followed by a deep belch. Cirocco didn't like it, and edged away.

"So what's next?" Gaby asked.

"I wish I knew."

"We could go back to where we started and wait there." Gaby did not seem enthusiastic about that idea.

Cirocco chewed it over for a while. Gaby was apparently willing to let her make the decisions.

"Okay. First we go to the top of this hill and see what it's like. One more thing I'd like to try if there's nothing worthwhile up there is to climb one

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of these trees. Maybe we could get high enough to see something. Do you think we could do it?"

Gaby studied a trunk. "Sure, in this gravity. That's no guarantee we'll be able to stick our heads out, though."

"I know. Let's go up the hill."

It was steeper than the countryside they had come through. There were places where they had to use hands and feet, and Gaby led the way through those because she had more experience in rock climbing. She was agile, much smaller and more limber than Cirocco, and soon Cirocco felt every month of the age difference between them.

"We've found our scenic viewpoint," Gaby said. She turned around and gave Cirocco a hand.

There were trees growing on the brow of the hill, but they did not approach the height of the ones behind them. Though they were dense and overgrown with vines, none was over ten meters tall.

Cirocco had wanted to climb the hill to see what was on the other side. Now she knew. The hill didn't have an other side.

Gaby was standing a few meters from the edge of a cliff. With every step Cirocco took the view adjusted itself, receding, encompassing more area. When she stood beside Gaby she still could not see the cliff face, but she had some idea of how long the drop was. It would be measured in kilometers. She felt her stomach lurch.

They stood at a natural window formed by a twenty-meter gap between the outermost trees. There was nothing in front of them but air for two hundred kilometers.

They were at one edge of the rim, looking across the breadth of Themis to the other side. Over there was a hairline shadow that might have been a cliff like the one they were standing on. Above the line was green land, fading to white, then to gray, and finally becoming a brilliant yellow as her eyes traveled up the sloping side to the translucent area in the roof.

Her eyes were drawn back down the curve to the distant cliff. Below it was more green land, with white clouds hugging the land or towering up higher than she was. It looked like the view from a mountaintop on Earth, but for one thing. The ground seemed level until she looked to the left or right.

It bent. She gulped, and craned her neck, twisting, trying to make it level, trying to deny that far away the land was higher than she was without ever having risen.

She gasped and clutched at the air, then went down on hands and knees. It felt better that way. She edged closer to the abyss and kept looking to her left. Far away was a land of shadow, tilted on its side for her examination. A dark sea twinkled in the night, a sea that somehow did not leave its shores and come spilling toward her. On the other side of the sea was another area of light, like the one in front of her, dwindling in the distance. Beyond it her view was cut off by the roof overhead, seeming to belly down to meet

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the land. She knew it was an illusion of the perspective; the roof would be just as high if she stood beneath it at that point.

They were on the edge of one of the areas of permanent day. A hazy terminator began to blanket the land to her right, not sharp and clear like the terminator of a planet seen from space, but fading through a twilight zone she estimated to be thirty or forty kilometers wide. Beyond that zone was night, but not blackness. There was a huge sea in there, twice as large as the one in the other direction, looking as if bright moonlight was falling on it. It sparkled like a plain of diamond.

"Isn't that the direction the wind came from?" Gaby asked.

"Yeah, if we didn't get turned around by a curve in the river."

"I don't think we did. That looks like ice to me."

Cirocco agreed. The ice sheet broke up as the sea narrowed to a neck, eventually becoming a river that ran in front of her and emptied into the other sea. The country over there was mountainous, rugged as a washboard. She did not understand how the river could thread its way through the mountains to join the sea on the other side. She decided the perspective was fooling her. Water would not flow uphill, even in Themis.

Beyond the ice was another daylight area, this one brighter and yellower than the others she could see, like desert sands. To reach it, she would have to travel across the frozen sea.

"Three days and two nights," Gaby sighed. "That worked out pretty well from the theory. I said we'd be able to see almost half the inside of Themis from any point. What I didn't figure on were *those* things."

Cirocco followed Gaby's pointing finger to a series of what looked like ropes that started on the land below and angled upward to the roof. There were three of them in a line almost directly in front of them, so that the nearest partially concealed the other two. Cirocco had seen them earlier, but had skipped over them because she could not understand it all at once. Now she looked closer, and frowned. Like a depressing number of things in Themis, they were huge.

The nearest one could serve as a model for all the rest. It was fifty kilometers away, but she could see that it was made of perhaps one hundred strands wound together. Each strand was two or three hundred meters thick. Further detail was lost at that distance.

The three in the row all angled steeply over the frozen sea, rising a hundred and fifty kilometers or more until they joined the roof at a point she knew must be one of the spokes, seen from the inside. It was a conical mouth, like the bell of a trumpet that flared to become the roof and sides of the rim enclosure. At the far edge of the bell, some five hundred kilometers away, she could make out more of the ropes.

There were more cables to her left, but these went straight up to the

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BIOLOG

by Jay Kay Klein

John Varley's writing career began with Robert Heinlein's guest editorial in the January, 1974 Analog. There, the famed author spelled out Five Rules for Success in Writing. Says John, "I followed Heinlein's five rules literally—I wrote, I finished it, I rewrote as little as possible, I sent it in, and I kept sending it when it was rejected. And it worked."

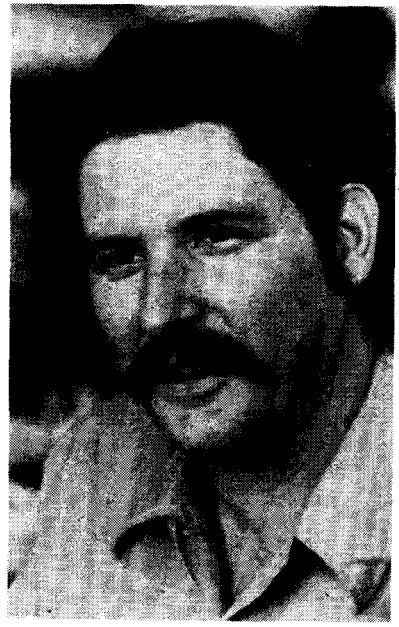
The first Varley story appeared later that year, and every story he's written to date has sold except his first novel, from which has sprung his Eight Worlds future history series. All writings so far have been science fiction. His first Analog story appears in this issue.

Known to old friends as "Herb," he is probably doomed to be called "John" by the vaster numbers of persons who inhabit the science fiction world. He was never a fan, though a longtime reader of science fiction. In fact, since he was raised in Texas it never occurred to him anyone could be a fan in remote Nederland, population circa 4000.

His reasons for starting to write science fiction are not unknown to many of its practitioners. "I was 26, with no skills, and needed more money than I had. I foolishly thought I could write SF. Imagine my surprise when I sold some." Readers and fellow writers have been less surprised, putting him up for Hugo and Nebula awards, and placing him second in voting for the 1976 John W. Campbell Award for best new writer.

John had started as a physics major at Michigan State, switching to English before dropping out when he decided there must be more interesting and worthwhile things in life. In the course of looking for these, he reached San Francisco, resided in the Woodstock Nation, and had a tour of the L.A. County Gaol. For the past three years he has lived in Eugene, Oregon with his wife and three children.

His two newest books are a story collection, Persistence of Vision, Dial Press and Quantum Books, and Titan, Berkley and Putnam.



John Varley

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arched ceiling and disappeared through it. Beyond them were other rows that angled toward the spoke mouth she could not see from her vantage point, the one over the sea in the mountains.

Where the cables joined the ground, they pulled it up into broad-based mountains.

"They look like the cables on a suspension bridge," Cirocco said.

"I agree. And I think that's what it is. There's no need for towers to support it. The cables can be fastened in the center. Themis is a circular suspension bridge."

Cirocco eased herself closer to the edge. She stuck her head over and looked down two kilometers to the ground.

The cliff was as near perpendicular as an irregular surface feature can be. Only near the bottom did it begin to flare out to meet the land below.

"You aren't thinking of going down that, are you?" Gaby asked.

"The thought had entered my mind, but I sure don't feel good about it. And what would be better down there than up here? We've got a pretty good idea we could survive up here." She stopped. Was that to be their only goal?

Given the chance, she would take adventure to security, if security meant building a hut from sticks and settling down to a diet of raw meat and fruit. She would be crazy in a month.

And the land below was beautiful. There were impossibly steep mountains with shining blue lakes set in them like gems. She could see waving grasslands, dense forests, and far to the east, the brooding midnight sea. There was no telling what dangers that land concealed, but it seemed to call to her.

"We might shinny down those vines," Gaby said, reaching over the edge and pointing out a possible line of descent.

The cliff face was encrusted with plants. The jungle spilled over the edge like a frozen torrent of water. Massive trees grew from the bare rock face, clinging like barnacles. The rock itself could be seen only in patches, and even there the news was not all bad. It looked like a basaltic formation, a closely packed sheaf of crystal pillars with broad hexagonal platforms where columns had broken off.

"It's doable," Cirocco said, at last. "It wouldn't be easy or safe. We'd have to think of a pretty good reason for trying it." Something better than the formless urge she felt to be down there, she thought.

"Hell, I don't want to be stuck up here, either," Gaby said, with a grin.

"Then your troubles are over," said a quiet voice from behind them.

Every muscle in Cirocco's body tensed. She bit her lip, forcing herself to move slowly until she was safely away from the edge.

"Up here. I've been waiting for you."

Sitting on a tree limb three meters from the ground, his bare feet dangling, was Calvin Greene. ■

TO BE CONTINUED

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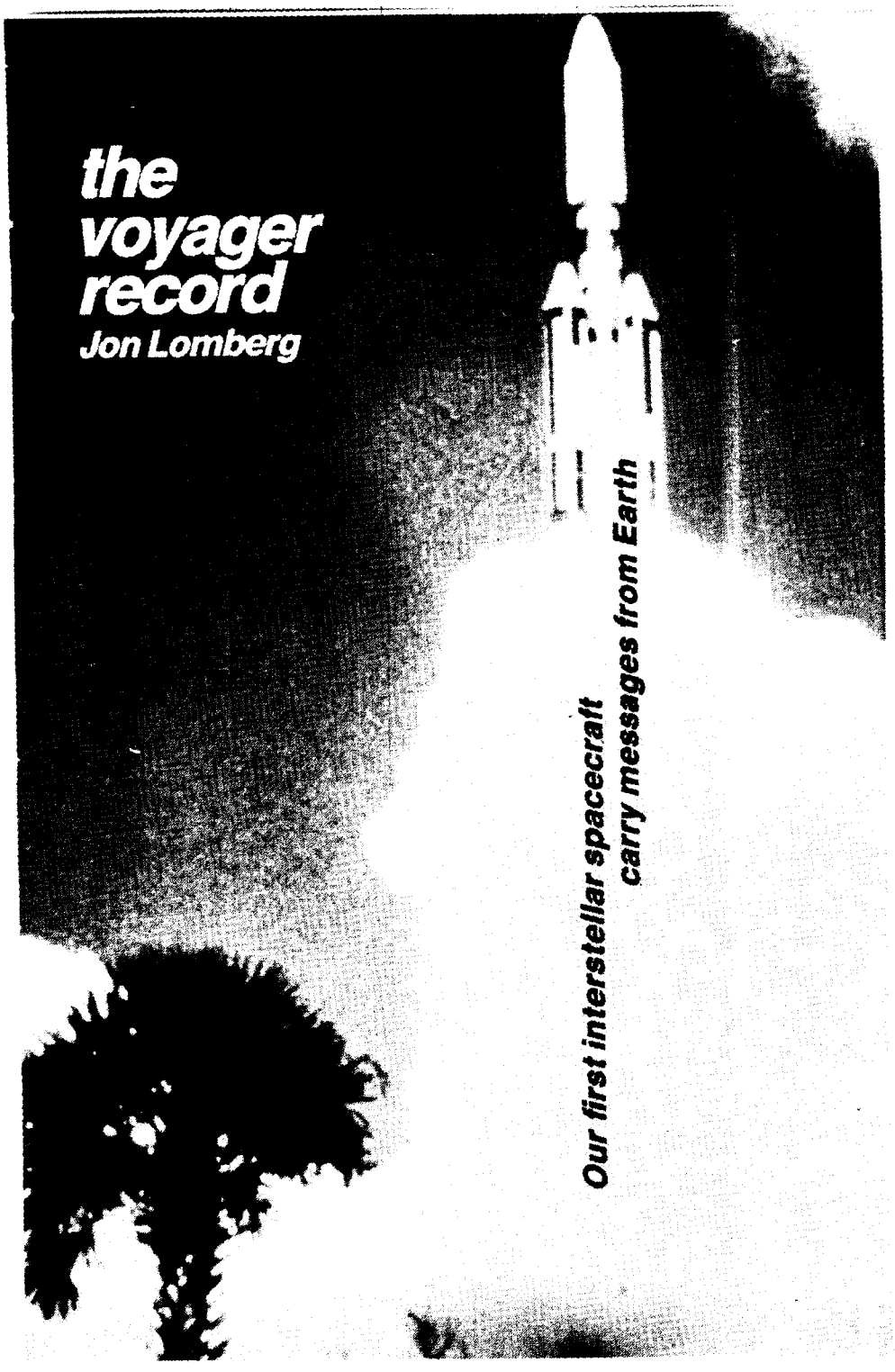

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In the summer of 1977, NASA launched two Voyager spacecraft on a mission to the outer solar system. Each spacecraft will fly past Jupiter and Saturn and some of their moons, and it is possible that a flyby of distant Uranus will be attempted also. Besides getting the best views of the outer planets ever, scientists hope to have a first look at enigmatic Titan, largest moon of Saturn and the only moon thought to possess a dense atmosphere. Because of their trajectories, the spacecraft will continue on past the planets to leave the solar system and drift through interstellar space forever—or until somebody finds them.

Because there is a remote chance that spacefaring aliens may someday find the derelict Voyagers adrift in the galaxy, NASA decided to enclose a message onboard, a message to give the finders some idea of who sent out these spacecraft. A similar message was conceived and designed by astronomers Carl Sagan and Frank Drake for the Pioneer 10 and 11 spacecraft which were launched in 1972, also to explore Jupiter and Saturn and then continue on forever. That message was an engraved plaque showing the hydrogen atom (to give some common units of measure), a pulsar map that showed the position of the Sun in the galaxy and the approximate time of launch, a diagram of the solar system, and a sketch of a man and woman. Sagan and Drake were again responsible for designing the message for the Voyager spacecraft.

It may be hundreds of millions of years (if ever) before either spacecraft is found, so any message had to be durable, and since most of the payload of the spacecraft was taken up with the instruments for studying the outer solar system, any message had to be small and light. Magnetic tape would not survive Jupiter's intense magnetic fields, and random molecular motion would decay any sort of microfilm. Etched metal seemed the most long-lasting material. Frank Drake realized that a phonograph record could contain a much longer and more complex message than a picture etched on metal. So the message on each spacecraft is in the form of a phonograph record made out of gold anodized copper, packed in an aluminum jacket, and bolted onto the spacecraft. It is virtually certain that neither Voyager will ever encounter another solar system or crash land on another planet, since space is spread so thinly with stars. But even drifting between stars, the record will occasionally be struck by tiny bits of dust and clumps of interstellar molecules. Eventually the aluminum will be worn away and the record pitted and destroyed—but not for a very long time. The most conservative estimates give the record a playing life of a billion years—and perhaps longer. Even if they are never found, the Voyager record will be one of Humanity's longest surviving relics.

I was asked by Sagan and Drake to be part of the team that designed the message for the Voyager record. I am an artist whose work deals largely with

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exobiology and interstellar communication, and for a long time I had been interested in the possible uses of art forms, particularly music, in interstellar communication. The idea of sending music on the Voyager record was appealing. The spacecraft itself, with its instruments and engines, will provide ample evidence of our scientific and technological achievements—but says nothing about our culture or the spiritual and aesthetic side of our mental life. Especially since musical forms and harmonies are often based on real physical constants and reflect, in some way, the laws of the physical universe we will have in common with another race, music seemed a good way of putting something of our soul into the message. So three-quarters of the record is devoted to music, music from all human cultures, selected by a team headed by Timothy Ferris. Western music is represented by classical composers like Bach, Beethoven, and Mozart, and by popular selections from jazz (Louis Armstrong), rock and roll (Chuck Berry), and blues (Blind Willie Johnson). But Western music is less than half the musical content. The rest is classical music from other countries like Java, India, and Japan. There is a Chinese piece for seven-string guitar called "Flowing Stream" that is at least 2500 years old. There is also folk music from Peru, Bulgaria, Central Asia, and Africa. Solomon Islanders play panpipes, and from New Guinea there comes a chant from a stone age tradition, music perhaps similar to that made by the first tool-bearing hominids a million years ago. Expert ethnomusicologists, like Alan Lomax and Robert Brown, chose this music to reflect the broadest range of humanity, because all of us on the team felt that this should not be a message from Western culture, but from all of Humanity, the voice of the whole world.

Besides music, the record consists of human voices, various sounds of Earth, and 116 pictures encoded electronically. A stereo cartridge and stylus is included with the record, and the cover of the record has etched on it a diagram that shows how the needle is to be placed in the grooves, how fast the record is to be spun, and how the pictures, which are in the form of video signals converted to sound signals, are to be reconverted back into pictures.

Human voices are heard giving greetings in fifty-five human languages. Originally the UN was asked to record a short greeting from each nation—what we got were ten-minute speeches from a few delegates. So at Cornell University, which was headquarters for the record team, students, faculty, employees and others were found who could speak the languages of Earth, and the montage of hellos includes greetings in Turkish, Hebrew, !Kung (the language of the Kalahari bushmen), and Akkadian. This section ends with a small voice saying in English, "Hello from the children of planet Earth."

Each of the speakers was asked to give some typical cordial greeting in

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his native tongue, and though the use to which these greetings was to be put was explained, some of the speakers recorded greetings which translate a bit oddly. (The Punjabi greeting translates, "Welcome home, it is a pleasure to receive you." The Indonesian translates, "Goodnight ladies and gentlemen, good-bye and see you next time.") It is not thought likely that aliens will make much sense of this portion of the message, though they may guess that it is the sound of our speech.

Following the voices is a "sound essay" produced by Anne Druyan, which contains about fifty different sounds of our planet. These begin with sounds of the planet and atmosphere (thunder, surf, wind, and rain) which aliens might recognize from their experiences with other Earthlike planets. Then there are sounds of the natural world: birds and insects, frogs, horses and chimpanzees (but not whales—with somewhat whimsical courtesy, a whale song of greeting has been included with the section of human greetings, since many people feel that whales are possibly as intelligent as human beings. Finally there are the sounds of humans and our activities: laughing, footsteps, sawing wood, an engine turning over, a foghorn, the beep of a telegraph, a jet shrieking through the air, a Saturn V countdown and liftoff, and a crying infant being soothed by its mother.

In terms of richness and information, the major part of the Voyager record is a few minutes of electric hum which translates into 116 photographs and diagrams. This picture message begins with a few pages of "dictionary" which teaches something of our symbolism (at least what numbers mean), some basic arithmetical operations, and units of weight, measure, and time. These units are derived from units specific to the natural emission of neutral hydrogen (the most common energy event in the universe) and converted to metric units. So throughout the message we can not only show things but give length in meters, centimeters or angstroms, weights in grams, etc.

The task of choosing representative pictures of the Earth and its inhabitants, which was my principal task on the team, was difficult. Various scientists and science fiction writers (including the MIT physicist Philip Morrison and writer Robert Heinlein) were asked for suggestions and "ground rules." I was most impressed by Heinlein's caveats about the problematic nature of pictorial symbolism—even an intelligent race with vision may never have hit upon the concept of picture. So we tried to include as many clues as possible as to the nature of pictures. The cover of the record shows diagrammatically how the wave form of the video signal is to be reconstructed as a picture, with a plain circle being the example used. And the first picture in the message, which in fact begins side 1 of the record, is that plain circle. So recipients would have the circle both as a three-dimensional engraving and

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as the first coded signal on the record. Hopefully when they are experimenting with ways to interpret this signal, formation of a circle should immediately tell them they are proceeding correctly. As another bit of insurance, various photographs in the message are preceded by silhouettes of the important objects in the photographs on plain white background. This should simplify the figure-ground relationship, and give a clue as to how we separate out the important information in a picture—and tell them specifically what we want them to be looking at.

The pictures themselves, which consist of photographs and diagrams, attempt to show various aspects of the natural world, the Earth's biosphere, and a hint of the diversity and richness of human culture. As in the music section, an attempt has been made to represent Global Humanity, not just Western or American Humanity. The sequence opens with pictures of the Sun's position in the galaxy (a repetition of the pulsar map of Pioneer 10, with the addition of the position of the Andromeda Galaxy relative to the Sun at the time of launch), schematic diagrams of the solar system, and pictures of some of the other planets (because from the point of view of aliens from another star system, Jupiter and Mars are as much a part of our home as New York City). A solar spectrum, with its distinctive G2 pattern of absorption lines, should make it possible for recipients to reproduce accurately all these pictures sent in color (20 out of 116 are in color). We focus in on our home planet with pictures of the Earth from space, showing the molecular composition of the atmosphere.

Scientific information continues with the structure and manner of replication of the DNA molecule (which is crucial to all Earth life), overlay diagrams showing superficial and deep human anatomy, and a sequence which gives an idea how human beings reproduce themselves, showing various stages in embryology from conception to birth.

There follow pictures of various geological features and landscapes of Earth—deserts and mesas, surf on the rocky Maine coast, an island on the Great Barrier Reef, the Grand Tetons and the Snake River, a coral reef in the Red Sea.

In an order which mirrors the sequence in the sound essay, scenes of the natural world are followed by examples of living things from various phyla—trees in bud, leaf, fall color, and crusted with winter ice; an insect winging past a daisy; a seashell; a small toad; animals at a water hole; dolphins leaping out of the water; chimps grooming each other.

Human beings make their appearance in a variety of poses and situations: a farmer from Guatemala, a Balinese dancer, five generations of a midwestern American family. These pictures, as all the pictures, were chosen more for informative value than for aesthetic appeal, and those of us who selected the pictures were re-

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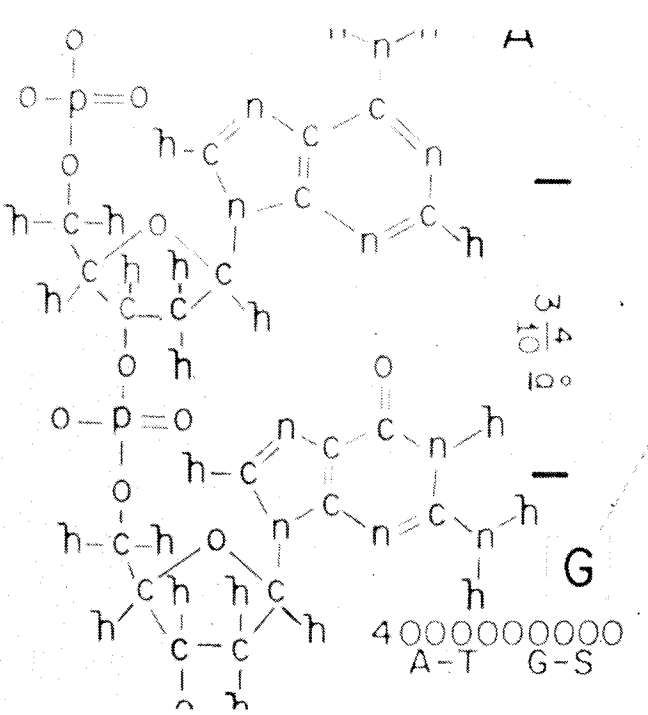

quired to play the role of extraterrestrial aliens, and try to notice what was missing from each picture, what unconscious assumptions were being made, what was lost in the way the picture was cropped. Was the background confusing? Could scale be ascertained? Had we shown enough thumbs, ears, teeth? Again and again, we would run across some picture that was perfect except that one foot would be cropped, for instance. Might aliens misinterpret this to mean that this individual had a flat bottom on one leg?

We tried to present the greatest range of human activities we could, from the most primitive to the most technological. A Thai craftsman carves wooden elephants in one picture, in another men at workbenches build precision machines. Bushmen spear an antelope on the veldt, and large harvesters cut swath through a cotton field. Sprinters from several countries dash toward an Olympic finish, while a stroboscopic action sequence of gymnast Cathy Rigby on the balance beam shows how we actually move from one position to the next (short of including an actual movie, this picture probably gives a better sense of human motion than anything else could have).

Human buildings and cities are represented, from huts to the Taj Mahal. Identical shots of the U.N. building by day and by night shows that we *have* night and that we light up our cities. A street scene in Pakistan shows a range of ground transportation from oxcarts to bicycles to automobiles

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Three of the photographs aboard the Voyager.

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(three and four wheeled), while another street scene shows a traffic jam at rush hour. After showing trains, jets, and tractor-treaded polar sno-cats, the apex of our technology is shown by photographs of the Arecibo radio Telescope, the lift-off of a Titan-Centaur (the launch vehicle of Voyager), and an American astronaut in space. The picture sequence ends with pictures of a violin and a string quartet. This last picture is followed by a snatch of the Beethoven string quartet that reappears as the last item in the music section. We hope that a photograph of people actually making music on instruments whose operation may be deduced will help aliens understand something of the nature of the music that comprises the rest of the record.

In collecting the pictures we were greatly assisted by a variety of organizations with access to large quantities of material: TIME/LIFE, the U.N. picture library, and most of all the National Geographic Society. We worked at a frantic pace (we had something less than a month to construct the whole message) but were lucky to get inputs from many sources.

Will this message ever be found and decoded? Everyone agrees that the chances of discovery are slim—but on the other hand a billion years is a long time—enough for Voyager to make one trip across the galaxy. And it is possible that the starships of advanced races may require extremely advanced remote sensing gear that might detect a metallic object like Voyager at a great distance (certainly anything like a Bussard ramjet would require such apparatus, if only to avoid a disastrous collision at near light-speed).

If it is found, could it be decoded? We are painfully aware of the philosophical, semantic, and cultural biases that underlie this message, and it may be that different races are too dissimilar for a message to get through. On the other hand, recipients will by definition be technological and scientific (they have to be to find Voyager in interstellar space), and if they are highly motivated and have experience with other races, they may in time crack the message—or give it to Someone Else who can. I enjoy imagining the sound of the Bach Partita or the Navaho night chant rebounding off the walls of some sleek star cruiser, while the crew finds that their tentacles or mandibles are beginning to tap out a rhythm, and Cathy Rigby turns a walkover on their viewscreens.

And even if Voyager is never found, it still seems to me worth doing. Since we may destroy this little world before long, it is good to think that something of us—including, perhaps, some of what is best in us, will survive and be present in the galaxy millennia from now—even if no one is there to listen to it. It will still be there. And launching Voyager shows that we are indeed coming of age as a spacefaring species. Voyager is an interstellar spacecraft. It is really going to the stars and out across the galaxy. And human beings, in the form of their art, their pictures, and the labor of those who made the message, are aboard for the trip. ■

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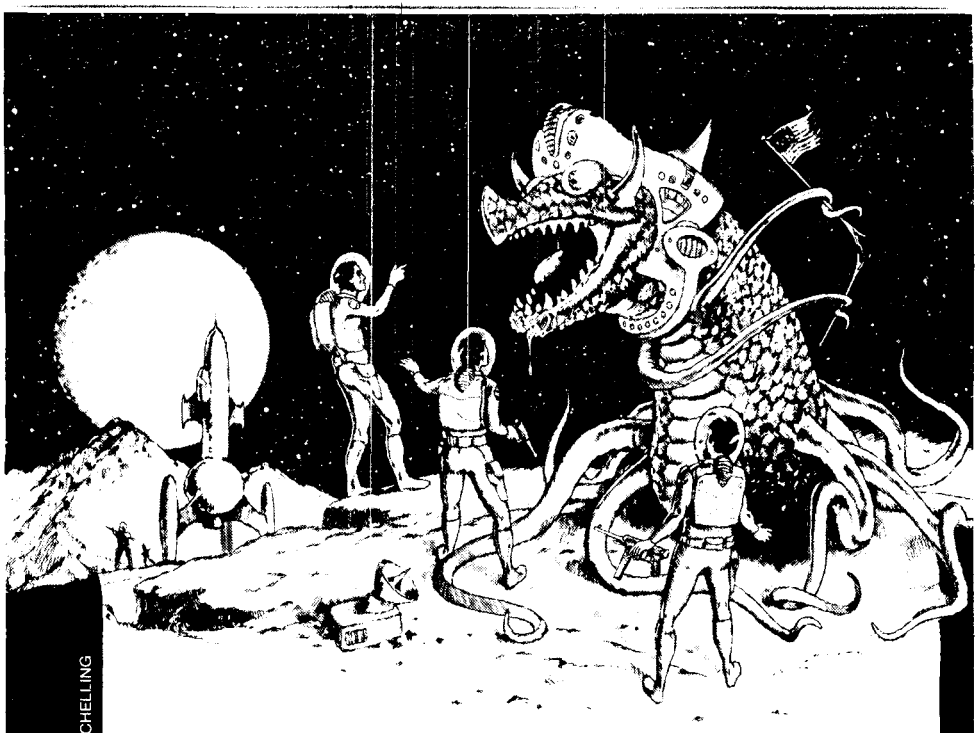

GEORGE SCHELLING

MAKING SENSE OF EXTRATERRESTRIAL

SENSES

There are animals with a sixth sense, literally, here on Earth. And elsewhere . . . ?

KENNETH JON ROSE

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When I was growing up, there was a phrase we used to end all parental arguments. Whatever the topic, the catchall excuse was that we were having a "communication gap." Well, I am older now and in the business of observing behavior, and I say that there is no such thing.

Or is there?

How could there be? Every creature on this planet communicates, in one way or another, with its own kind. Without communication, reproduction would be impossible and social behavior nonexistent.

But, what about two different species? Does a communication gap exist between them? If so, why? In order to answer these questions, we must first understand the mechanisms of communication.

Several months ago, I found an excellent example of human communication. Unfortunately, it happened when I was caught in a radar speed trap on Cape Cod. The police are experts at nonverbal disclosure of information. This fact became all too real when the patrolman, who was watching my car come ever nearer to his, stepped out of his vehicle, walked calmly to the middle of the road, and stopped. Then, as every driver who has ever been in this predicament knows, he pointed his extended arm at my already decelerated car, and in one flowing move, pointed to the curve beside him. He was not saluting me. He was, of course, telling me to pull over. In that one simple gesture he had conveyed an entire breath's-worth of sound. I pulled over. (But, as it turned out, I never did get a ticket. It seemed that he was a marine biologist, and that running down speedsters was only a summer job. And, being a marine biologist myself . . .)

Certainly, there was no communication gap here. The information was received exactly as it had been given. And how was it received? Obviously, the policeman's behavior was a visual display. Therefore, the message was intended for my eyes. A blind person would not have known to pull over. Still, we can do a bit of fantasizing and pretend that I had kidnapped a deaf man and did not want to pull over. So, after I passed the speed trap, the flustered patrolman would jump into his car, chase after me, and put on his siren. In this case, both the blind person and myself would hear the noise, whereas the deaf man would not.

It is a belabored point, but, nevertheless, it is clear. We transmit and receive information solely by the use of our senses. On Earth, and with constant social interactions, this statement is self-evident. This is the way we perceive our world and the way we would expect others to perceive it.

On Earth.

Suppose, now, that we are many years into the future and are able to explore a distant planet of some distant star. And, suppose that, on this planet, which we have found can fully produce and support life, we meet up with a native. How will we communicate with it? Well, we might try

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waving at it, or we could talk to it, or, if we're feeling particularly brave, we could touch it. But, what if it just "stands" there and does nothing? What do we do then? Label it as being something like an Earth cow? Perhaps. Yet, let's assume that unknown to us, this *thing* is very intelligent. And, that at the very instant that we are trying to communicate with it through flashing lights and whistles, it is desperately trying its damndest to get our attention.

The popular movie depiction of a creature from God-knows-where with a grotesque head with two eyes and ears (however distorted), a nose and a mouth implies that this creature can see, hear, smell, and voice opinions as well as the next Man. But, this does not have to be so on this planet (or for that matter, on many others). If, as we assume, this being has senses other than our own, then it will have sensory outlets that are also different than our own. Therefore, this creature will have a way of communicating information that is totally alien to what we could possibly receive.

So the scene of both parties trying desperately to raise a topic of conversation while both thinking of the other as nothing more than a dirty blob of organic matter may someday become reality.

That day may be closer than we think. We have already sent a written invitation, attached to Pioneer 10, to our extraterrestrial neighbors. There is no need to get into much detail about it. We all remember what it said. But, that is not as important here as *how* it was said. Somehow we made a mistake; a mistake that, nevertheless, could not have been helped. We sent the engraved message intending it to be read by creatures with the same sensory capabilities as ourselves. Yet, what if it should be intercepted by our native friend?

Perhaps now, before that day arises, we can learn from a few examples on planet Earth of what it is like to perceive the same universe in a totally different way from our own.

One of the most important points and one that is seldom realized when dealing with behavior—of *any organism* in *any situation*—is that an organism lives in a physical world that conforms to exact physical laws. Therefore, that organism's behavior, be it communication or the simple act of feeding, must be conforming to those same laws.

Our planet also obeys the universal laws of physics: it revolves around the Sun in an elliptical orbit, rotates about its axis, and sports both a gravitational and (for reasons not fully known) a magnetic field. These phenomena, as we will see, play a major role in an organism's behavior.

There are many animals on this planet that have sensory systems that are more acute than or slightly modified from ours.

The pit viper (of which the rattlesnake is a member) has a small sensory pit on each side of its head just above the mouth which it uses to sense small animals at night. As it turns out, these

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organs are very sensitive to infrared light. This makes them heat sensitive. In fact, I was astounded at how sensitive these creatures really are. Studies have shown that they can detect as little as a 0.36°F difference in temperature from the surrounding air. Behaviorally, this is a definite advantage since the little rodents and small birds the snakes prey on do give off small amounts of body heat. But, small as they may be, the pit vipers can still detect these animals from several feet away.

Still another animal that uses the invisible (to us!) light spectrum in feeding is the bee. I am sure that, at one time, you have ventured outside wearing a brightly-colored blue or spotlessly-clean white shirt only to find several bees gathering around your body ready to take the pollen from your ears. Well, that is due to the ultraviolet light the shirt reflects. The same holds true for the discrimination of different flowers. Flowers that may look the same color to us may be quite dissimilar to the bee. Bees are even able to use polarized light from the Sun (light waves that vibrate in a definite pattern) to their advantage and are thereby capable of finding the hive in relation to the Sun—even on a cloudy day.

A list of extraordinary sensory systems would not be complete without mention of the bat. Though all bats have functional eyes, they primarily use high-frequency sound on the order of 100,000 cycles per second (five times the highest frequency we can hear) to locate their prey. Bats emit these sounds from their mouths or nostrils (depending on the species) and are able to orient themselves with their surroundings by interpreting the returning echoes. This phenomenon is called echo-location. In order for bats to navigate and find food, they must send out several short clicks or sound pulses. It is the number and frequency modulations of these pulses that determine where the bat is in relation to its environment. They basically have the advantages of both FM and pulsed sonar all in one.

One would then assume that all flying insect life would be helpless against this silent night hunter. This is not the case. In fact, there are two families of moths, *Noctuidae* and *Geometridae*, that have ears to detect the bats' ultrasonic cries. So sensitive is their hearing, that, even before the bat knows that they are there, they will have already dive-bombed toward Earth. Yet, there are several moths of the *Arctiidae* family (which includes the moths whose caterpillars are known as woolly bears) that take this evasive action one step further. When they hear the bats' high-frequency clicks, they don't drop to the ground, but rather start producing high-frequency clicks of their own. By rapidly contracting and relaxing their leg muscles and bending an overlying cuticle, these moths can cause utter havoc to the bats' excellent orientation system until the bat lets the tiny insects alone and seeks easier (or at least, less confusing) prey.

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Although bats, bees, and snakes have sensory systems that are different than ours, they are really not *that* different. The bat still produces and hears sound. The bee still uses its eyes to distinguish one flower from the next. And the pit viper still uses heat receptors to find its prey. So we must look elsewhere if we are going to find a creature that has a sense that is totally dissimilar to any of the five senses we have or could modify.

Surprisingly, there *is* a class of animals that has a sensory system that is so completely different than anything we could imagine that only recently have we discovered what it is. This animal has an electric sense. No, it is not the electric eel—an animal that is able to produce a very strong electric field around itself for use in stunning prey. This animal is a receiver of electrical fields which it makes use of in a most astounding way. This animal is the shark.

The shark. That creature of the sea with sharp jutting teeth and a voracious appetite, who has been on the Earth for three hundred million years, may just well have the type of sense we may encounter in that native of some distant planet.

I had the unique opportunity to study the sharks' electric sense firsthand at the Woods Hole Oceanographic Institution on Cape Cod. And it couldn't have revealed itself any better than by what I saw one night while observing sharks in the ocean.

The tremendous gap between research in theory and the actual execution of it in the field came vividly to mind as Dr. Adrianus Kalmijn, the scientist directing the project, and I sat shivering in a small rubber raft (rubber, because it keeps in electrical fields produced from our equipment and ourselves—a fact that becomes important later on) two hundred feet from shore. Fortunately, the water that day had been very calm so that we had no trouble staying in one position over a certain plot of ocean bottom. We placed a long line of rope and plastic tubing, which we had built several days before, under the raft and stretched part of it across a patch of sand seven feet below us. In the center of the line resting on the bottom was a hole we had cut in the plastic tubing to release fish blood. On either side of this opening we placed two sets of current-carrying electrodes. The two ends of the line were in the boat, connected to our equipment. Thus, the line looked like a large triangle below the water with our raft acting as its apex. Finally, when our equipment was set up, we placed an underwater light and a glass-bottomed viewing box in the water and made ready for the next phase in our experiment.

Sharks, by nature, become very aroused given only small amounts of fish blood in the water. But for our purposes, in order to bring as many sharks to our location as possible in the shortest amount of time, we had to use large quantities of fish odor. So there we were, the two of us in a rubber raft the size of a bathtub, throwing out pounds of cut herring

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and pumping out pints of fish blood from the plastic tubing. I imagined that the small fish already under our raft were thinking that we were a dying whale ready to be eaten. I prayed that the sharks would not have the same idea.

Our methods were quite effective, for suddenly something large and dark collided with the raft's underwater light and then disappeared from view. Just by the size and shape, I knew it was the Smooth Dogfish shark, *Mustelis canis*—a harmless species that preys on small local fish as well as on crustaceans and other invertebrates. Within seconds, another shark of the same species swam over the rope stretched across the sand patch looking for the prey that was giving off so much odor. Several other sharks followed and soon the area was populated with them. Out of curiosity we looked up. We saw a sight that made us glad that these fish were harmless. In the green illumination that surrounded us, we could actually see the gray shadowy figures of sharks slowly rising and circling about the raft.

Now we turned on one of the electrode sets to produce a small electrical field around the raft. And, just as we did that, one of the sharks took an interest in the rope. It swam over it, turned, and glided even closer to the electrode pair. And then, within inches of the live electrodes, it swooped down and attacked them, biting and thrashing them in an attempt to rip them apart—while totally ignoring the other electrodes or the opening of the odor tube! But if this wasn't enough, each shark that entered the area responded in the exact same way.

Right about now you should be wondering why the sharks became interested and bit the live electrodes in the first place. There are, of course, no swimming electrodes in the ocean for sharks to prey on, nor do sharks have poor eyesight (in fact their eyesight is quite good). So, why did the sharks attack the electrode? It involves their electric sense.

You and I and every living organism unintentionally produces an electrical field in water. It is an *extremely* weak field and can only be detected by the most sensitive equipment. Basically it arises from differences in the electrical potential of the skin, which varies from one area of the body to another. And because water, especially dirty water, is a good conductor, these differences produce electrical currents. Now, knowing that an electrical field is constantly with an animal wherever it goes, wouldn't it stand to reason that if a predator wanted to pinpoint exactly where this animal was it might have some sort of sense for this purpose? Well, as it turns out, sharks have just that.

If you ever get the chance to see a shark (one either behind glass or on a table), take a good look at its head—especially the snout. You should notice hundreds of small pores in its skin. These are the ampullae of Lorenzini. Their function, as we now know, is to detect weak electric fields.

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As I mentioned earlier, animals in the sea produce an electrical field around themselves. But, I also mentioned that it is an extremely weak field. How weak is it? A small fish might put out a field of only a few microvolts per centimeter. So, in order for a shark to sense these fields, it must be very sensitive. In fact, sharks are extremely sensitive to electrical fields in their environment. Operating in the frequency range of direct-current up to about eight hertz, they can respond to fields as low as a hundred-millionth of a volt per centimeter. And just to give you some perspective of what that really means: it would be equivalent to the field of a flashlight battery connected to electrodes spaced a thousand miles apart in the ocean. So we can see that the shark would have absolutely no problem sensing an organism's electrical field. But it would have to get close enough to the animal to do this and by then the shark would have seen it. So what good is the electric sense?

Perhaps we should put ourselves in the sharks' place and find out. We begin by roaming through the ocean looking for food. It is a preoccupation with us for we spend most of our time doing it. And we are quite efficient at it too. Not only do we have a keen sense of smell, but also excellent eyesight, a fine sensitivity to minute movements in water, and of course, our electric sense. We are, in every sense (excuse the pun), a hunting and eating machine. The odor of blood swirls around in our nares and we decide to follow the trail toward the wounded prey. It is also about now that we are getting signals from our lateral line (the band of organs running the length of our body that is sensitive to movements) and we know that there is a struggling animal several yards ahead of us. Our vision and sense of smell are useless now because the water has become saturated with blood and quite murky. So the only thing left is to use our electric sense and we plow through the water trying to locate the wounded prey. Suddenly we pick up a strong electrical field and, knowing that this field is always associated with food, we dive at the fish and swallow it whole.

In actuality, sharks don't turn one system off and another one on but, like us, they have several senses and use the one or two that are sensitive at that particular moment. The sharks' electric sense is usually the last resort in finding prey, but they can rely on it quite heavily.

We saw this when we were floating in our raft off of Cape Cod. The sharks attacked the electrode even though there was no fish around it. Several years ago Kalmijn, the scientist who really discovered all of this, passed a weak electrical current between two electrodes and buried them in the sand of a shark tank. Then he motivated the sharks to feed by putting a little fish extract in the water. The sharks charged the electrodes as if they were the real prey. In fact, the electrical field was so tempting, that when a piece of odor-producing fish

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was placed a short distance from the electrodes, the sharks, although attracted by the odor, dove at the electrodes rather than at the fish!

Therefore, we can sum up by saying that the sharks bit the electrodes because the electrical field around them was something that the sharks could ultimately depend on as the most localized and precise cue for spotting their prey. In other words, the electrical field was a sure thing, where there was an electrical field there was always going to be something to eat. That is why they were fooled into biting the electrodes.

Sharks are not the only ones with this sense. Skates, stingrays and, surprisingly enough, catfish have an electric sense. All are quite sensitive to electrical fields in water and all use this capability to find their prey.

Up to this point I have talked about the sharks' electric sense as a fish finder. This is not its only function. To see why, I will need to explain some physics.

If we move a wire through a magnetic field, a current will flow that is perpendicular to that field. The same principles apply when a fish swims through the Earth's magnetic field. If a fish cruises with a velocity v through the Earth's magnetic field B, a voltage gradient $v \times B$ is induced in the animal. As a result, electric currents circulate through the fish and the water around it. Sharks, it seems, make use of these fields by using their ampullae of Lorenzini to indicate their compass direction. The Earth's magnetic field has two components to it: one horizontal and one vertical (if you turn your compass so that it is perpendicular to the ground you may notice this). It is the horizontal component of the geomagnetic field that the sharks use to navigate. When the shark swims westward, the dorsal ampullae become positive with respect to the ventral ampullae and the opposite is true when the shark swims eastward (the dorsal ampullae become negative with respect to the ventral ampullae). What this ultimately means is that the sharks have an internal electromagnetic compass; a true compass sense.

If all of this sounds rather incredible to you, it really isn't. Sharks have been swimming in the ocean for three hundred million years and all of that time there has been a magnetic field around the Earth. Also, the sea is a very good electrical conductor. Putting these facts together, we can see how the shark might have received its electric sense.

One of the points I raised when I first began talking about behavior was that an organism lives in a physical world that conforms to physical laws. Thus, an organism's behavior must conform to those same laws. We saw that, because of the properties of air, the bat could both communicate and fly. We also saw that the electric sense of the shark depended on its water environment.

So what have we learned from all of these examples that we might now transfer to the study of organismal behavior on another planet? Knowing

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that behavior is an integral part of the physical environment, we might expect that if we made an inspection of the natural phenomena that govern a particular life-supporting planet, we might be able to determine the senses that a creature has. Now, let's go back and visit that native.

As you may recall, we were pretty much at a standstill when we last left the two parties trying to communicate. But that was before we knew of the existence of senses other than our own. Perhaps now with the information we have thus acquired, we can figure out how that native is transmitting its signals to us and maybe we can start getting somewhere.

First we should examine the beast. Physically it is shaped like a rounded pyramid with its peak squashed down by a shallow bowl. Set into its sides are several small dishlike objects and surrounding them are a few narrow tubes. But, so far this doesn't tell us much.

The next step then, is to examine the planet. We find that it is the second planet from its sun but that it is as far from it as Jupiter is to ours. Yet, it is surprisingly warm. It also has a gravitational field that is two-thirds that of Earth's (which may explain how a creature of its size and shape can survive without looking like a pancake). The most interesting thing about the planet, though, is that it is emitting microwave radiation. That's both good and bad news for us because, even though we may have found a possible medium for communication, we may be sick and probably sterile when we finish communicating.

Sure enough, we note by careful measurement that the organism *is* giving off very small quantities of microwaves (not to say that it is a moving oven), apparently being first collected by the shallow bowl and then being focused and beamed by the narrow tubes; the disks possibly receivers. We were lucky this time. Now that we know the medium of communication, all we have to do is to send back a microwaved message saying: "keep it short and simple."

What I have dreamed up is speculative fiction. The day may come, though, when we will try to communicate with a member of another planet with no success—simply because we have no common senses. We will have to decide then whether the creature is indeed intelligent and worth the effort to find a transmitting sensory system, or whether we should use it as a food source. Hopefully, we will be able to bridge the communication gap quickly before that creature chooses not to bother to evaluate our senses and prepares its feeding apparatus instead.

After graduating from the University of Connecticut in 1976 with a degree in psychology, **Kenneth Jon Rose** spent two years studying the sharks' electric sense at the Woods Hole Oceanographic Institution in Woods Hole, Massachusetts. He is working toward a doctorate in marine biology, specifically in the area of communication and orientation of marine fishes. ■

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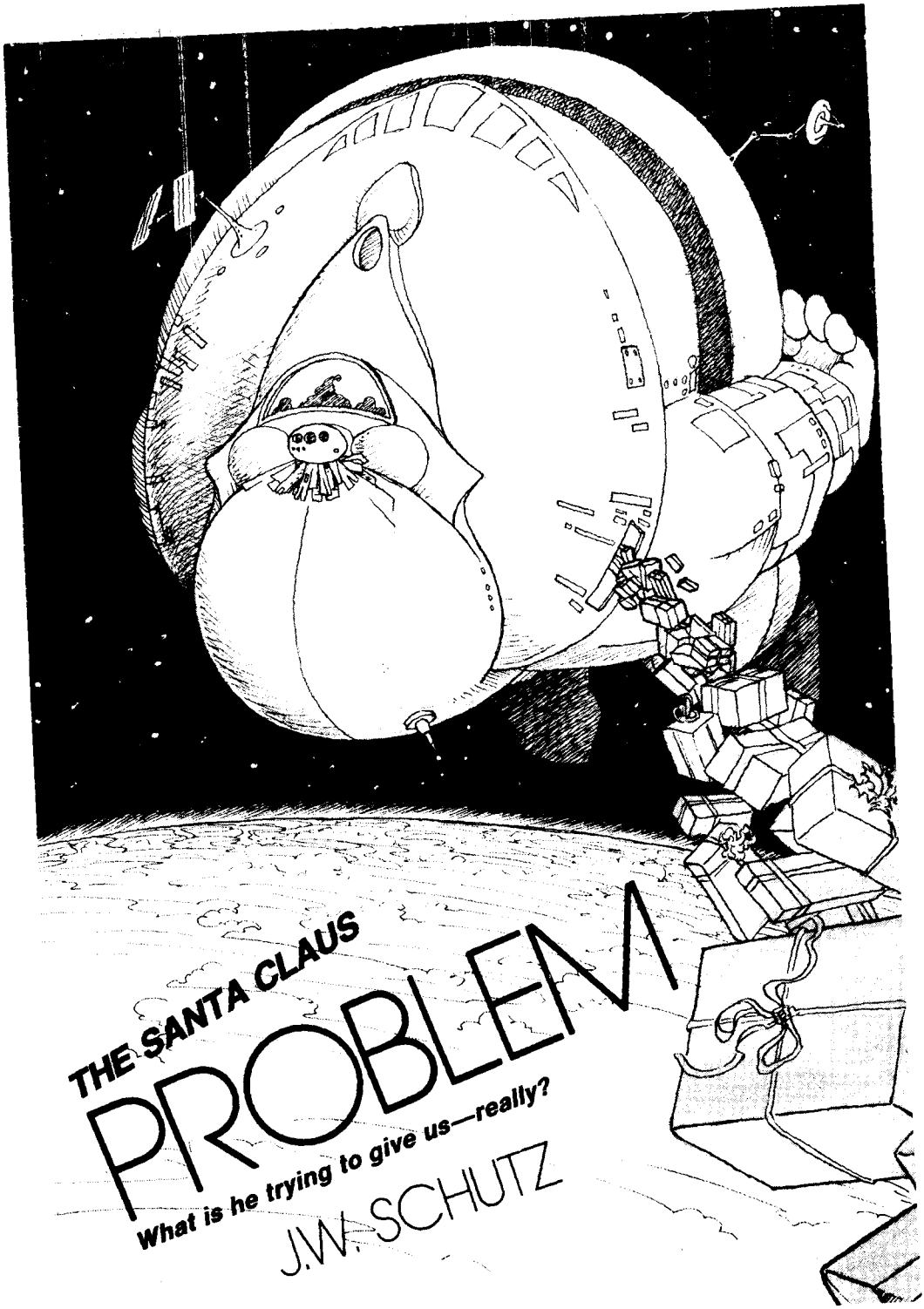

THE SANTA CLAUS PROBLEM

What is he trying to give us—really?

J.W. SCHUTZ

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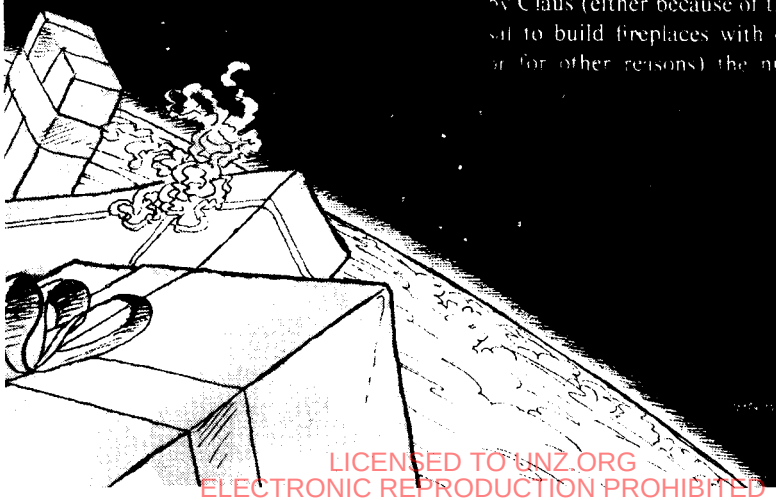
Being, like most men of science, of an enquiring mind, I have recently turned my attention to what I shall call, for reasons which will immediately become obvious, the Santa Claus Problem.

The parameters of the problem are well known. I repeat them here, purely for reference. On the night of December 24th of each year, a personage, variously known as Father Christmas, Saint Nicholas, or Santa Claus, visits, by means of a flying device drawn by a team of reindeer, each household on Earth where there are children, descends the chimney of the house and leaves presents in stockings (mainly in North America) or in shoes (principally in Europe) for the said children. In certain instances he is also said to take the time for last-minute decoration of a Christmas tree, but, since in the majority of cases the tree is predecorated, this factor may be ignored.

Before proceeding to its solution I have considered it advisable to establish the reality and indeed the pertinence of the problem itself. This turned out to be relatively simple, since for during more than fifteen hundred years countless millions of individuals have agreed that the phenomenon does occur and have described with astonishing consistency the flying device, with the appearance of a miniature sleigh, and its team of animals, as well as the appearance, and even the costume, of Claus himself. There can be no doubt therefore that the problem is factually based.

Next I considered the total extent of the problem. The population of the Earth is estimated at 4.2×10^9 individuals. The average family consists of two parents and 2.7 children. In order to remain on the conservative side in what follows, it must be assumed, then, that each visited household contains five persons and that there are thus $(4.2 \div 5) \times 10^9$ such households or 8.4×10^8. If we further neglect, in the interests of conservatism, those families among the Hottentots, the Maoris, Polynesians, etc., not visited by Claus (either because of their refusal to build fireplaces with chimneys or for other reasons) the number of



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visited households can reasonably be reduced by an order of magnitude, leaving us with 8.4×10^7 households.

The following step is of crucial importance and one which required many hours of painstaking and time-consuming research: considering every dwelling on Earth with a fireplace connected to the roof by a chimney, what is the average distance between them?

In the residential sections of most cities, the distance is small—a matter of a few yards—but in rural areas, and considering the average distance between cities, the distance may attain several miles. I will not detail my methods in this article but the enquiring reader may obtain a complete description of them from my thesis published February 30, 1916 by the University Press of Doowahdiddy, Georgia. It turns out, however, that the average distance is approximately 104.957 yards. Again in order to remain on the conservative side, the fraction may be dropped and the distance set at 104 yards.

Now, multiplying 8.4×10^7 (the number of visited households) by 104 (the number of yards between them) we obtain 8.736×10^9 yards or 4.963×10^6 miles. This, then, is the average distance traveled by Claus and his team during the night of December 24th.

I next considered the time available to cover this distance. It is not, as might at first be supposed, the period covering the hours of darkness at any single locality—that is to say between 10:00 PM, and 4:00 AM—but, since the entire globe is under consideration, twenty-four hours plus two additional hours at the start of the journey and four more at its end, a total of thirty hours.

Dividing the distance covered by the time available we have a velocity of 4,936,000/30 or 164,533.33 miles per hour. This is not only many times greater than the speed of sound but indeed greater than the escape velocity from the Earth itself. There can be no doubt therefore that Claus and his team are the fastest-moving living creatures on Earth if not in the entire universe.

An interesting sidelight on the problem reveals that Claus has only 1.286×10^{-3} second to descend each chimney, place presents in stockings, regain his vehicle and reach the next visited household.

Assuming that the given parameters are accurate and that the above calculations have been carefully carried out, we may now move on to our conclusions.

There are three possibilities:

(1) Claus and his reindeer are a myth and the children's parents are responsible for the appearance of presents on Christmas morning.

(2) Being physically unable to accomplish his self-appointed task alone, Claus has recruited a vast number of helpers.

(3) Claus does indeed personally visit and leave presents at 8.4×10^7 households, but does so by means as yet undiscovered by science.

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Let us examine these hypotheses one by one.

(1) The myth. There is some small amount of support for this hypothesis in the fact that for months before the fatal date the stores are jammed with harried adults buying a wide variety of semi-useful as well as totally useless presents including "educational" toys. There is also the occurrence of widespread cynicism among the older children. The myth possibility must be ruled out, however, not only on the basis of the facts set forth in paragraph three of this article, but also on the grounds that the shopping adults are in 98.753 percent of the time buying presents for each other, and on the far more important grounds that the children invariably receive presents which no sane parent would willingly purchase for them, such as various cutting tools, air rifles, candid cameras and the like.

(2) The helpers theory. Here too there is a modicum of support for this hypothesis. It is widely believed, for example, that Claus has recruited the services of a large number of gnomes who spend their time during the year manufacturing the vast numbers of toys required, receiving, classifying, and tabulating correspondence from children, etc. While there may be some basis for this belief, this researcher has been completely unable to uncover any evidence that any of the gnomes accompany Claus on his annual voyage or make such voyages in his stead. If the gnomes exist, they cannot be numerous since their presence, even at the north pole, would have been discovered before now. As for their making millions of individual voyages disguised as Claus himself, they would, if operating at normal subsonic speeds, be so numerous that they would surely by now have been admitted to membership in the United Nations and would be wooed by both the U.S. and the U.S.S.R. because of their highly strategic location and their one-night potential for espionage. The helpers theory too must then be ruled out.

Which brings us inevitably to the third possibility.

(3) Claus visits 8.4×10^7 households in a period of thirty hours but does so by as yet unknown means.

The support for the first part of this hypothesis is overwhelming. (*Viz* para 3 at the beginning of this paper and the giving of such presents as chemistry sets and little nurse outfits.) There are certain objections, however, to the physical means of accomplishing the objective, at least by means now known to science.

Consider first the velocity of the vehicle drawn by these admittedly remarkable reindeer. At 164,533 miles per hour the energy requirements would be astronomical. Since the fuel is tundra moss, notably low in caloric value, this single night's work would require the northern hemisphere's tundra to be totally stripped to a depth of three feet. As a corollary, several millimeters of reindeer excrement would be distributed over the whole surface of the globe. Nothing of the

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sort is known to occur. Similarly with one household visited every 1.3 thousandths of a second at supersonic speeds, the night of December 24th would be made hideous with a continuous thunder of supersonic booms making sleep on this traditionally peaceful night impossible.

Since the appearance once a year of Claus's presents in millions of households is an unquestioned fact and since it is logically incontrovertible that Claus and Claus alone is responsible, we must inevitably conclude that Claus exists and that he has done so for at least 1,500 years.

It seems equally clear—given the considerations concerning speed and energy consumption mentioned two paragraphs previous—that Claus must have at his disposal some other means of delivery than physically visiting each several home.

We are thus inexorably led to the following conclusions:

(a) That the entity variously known as Claus, Nicholas, etc., is an extraterrestrial as evidenced by his great age.

(b) That this entity possesses scientific abilities well beyond those of twentieth-century savants and that at least one of his devices is a matter transmitter.

In support of conclusion (b), I offer the following tentative hypothesis:

It is quite easily conceivable that Claus is capable of putting his vehicle into a circumpolar orbit making one circuit every ninety-plus minutes. Indeed modern man is himself able to perform this feat. In the thirty hours available on the night of December 24th he would have time to make twenty orbits, covering every locality on the face of the globe. It is also easily within the realms of possibility that the Claus-entity possesses a computer capable of recording the locale of every one of eighty-odd million homes having children. Given, then, a matter transmitter, he makes his leisurely twenty orbits and, with the help of his in-flight computer, leaves behind him a blanket of millions of useless or actually dangerous toys, silently and instantaneously appearing on millions of hearths. I will go further. It is well known that Christmas toys are usually destroyed by their recipients no later than the beginning of summer vacations, at which time the last trace of them disappears. It is my contention that the Claus-entity makes a second trip at this time, recovers the wreckage of his gifts and recycles them in preparation for the following December.

It has been said, with justice, that once a thing is known to be possible, men will do it. Being firmly persuaded that a device equivalent to a matter transmitter is not only possible but that one actually exists, I am devoting my future scientific efforts to the construction of one. I may even go so far as to hint that I have several promising leads, papers concerning which I plan to publish through the University Press of Doowahdiddy some time within the next twelve months, and hopefully, before December 24th of next year. ■

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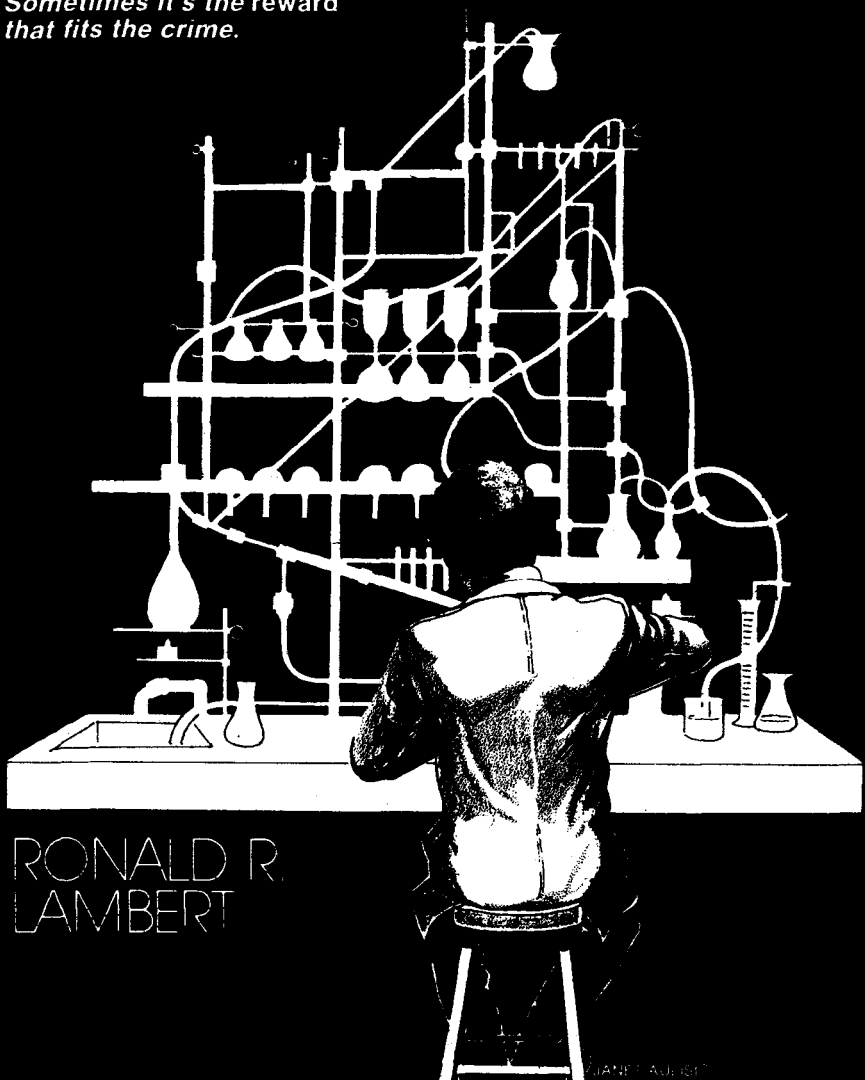
THE LAST ALCHEMIST

Sometimes it's the reward that fits the crime.



RONALD R. LAMBERT

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Footsteps sounded in the hall, approaching his door. He froze, and held his breath. The blue flame from the bunsen burner stood up straight, at attention. Beside it the Pyrex flask filled with steaming amber liquid waited at parade rest.

He jumped when the door swung open. Cal Hartridge, the project supervisor, strode in like he owned the place. Hartridge was medium height, heavy built, with thinning gray hair and a round, florid face. He stopped in the middle of the room, hands on hips, and his eyes darted around. "What are you working on, Ray?" he asked mildly, but with eyes narrowed in suspicion.

Raymond Lyttle winced guiltily, then frowned in rejection of guilt. Feigning nonchalance, he casually turned and extinguished the bunsen burner. "I'm working on this week's new washday miracle!" he grumbled.

"Sure you are." Hartridge walked off at a tangent, stopping before a workbench at the side of the room, and seemed to study the centrifuge fraction separator there.

The silence was acute, like the pause before the second shoe is dropped. Lyttle bridled and straightened to his full 195 centimeter height. "You have some criticism?" he demanded. "My work record shows more patents than any other person in this building! I've given you your improved aspirin substitutes, your stickier adhesive tape, your enzymes for making meat analogs out of peanuts. Aren't you satisfied?"

The super turned to him. Leaning back against the bench and crossing his arms, he locked eyes with Lyttle. "I have no criticism of your work record, Ray. I just question the ethics of your using company time and facilities for pursuing private projects." Then he softened his tone slightly and held out his hand. "Look man, I've got responsibilities. Personally, I don't care what you do, as long as you produce. I can see it your way. But I'm responsible to the company, see? I'm not supposed to allow this sort of thing. This sort of thing, specifically. That's my job."

With an indifferent shrug, Lyttle replied, "So, what are you going to do? Report me?"

Hartridge sighed and looked pained. "I'm not a tattletale. I'm just talking to you, understand? You represent a problem to me, and I'm explaining it to you. A word to the wise and all that, huh?"

Lyttle nodded slowly. "I take it you're giving me a warning then?"

Again the expression on Hartridge's face was pained. Then he shrugged. "Take it however you will," he said tiredly. With that, he shoved off from the bench and walked out.

Resentful and trembling slightly with reaction, Lyttle turned back to the bench before him to finish what he had been doing. So, he thought ruefully, the crisis has come. He'd been found out. Maybe a few more days, at most a few more weeks, and then someone would give him the company's ultimatum: Abide by policy or get

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out. But by then, he thought hopefully, maybe he would be ready to step out on his own, independent. If he was right with this formulation, and it worked where the previous ones had failed, then he would no longer need the company, no longer need to work for anyone. The world would beat a path to his door. It really would—if he were successful. Then he would be financially independent. He could fund his own research projects. The yearning that came as he imagined such freedom was a physical ache.

He decanted the amber liquid into an Erlenmeyer flask; as always, meticulously careful not to spill anything. He had a true chemist's pride for neatness. That was one of the things that set him apart from the others, he told himself—from the jobbers, the hirelings, content merely with coming up with slightly different ways to make whites whiter every so often.

He spared a thought of pity for them. It wasn't that they were uneducated; they were just mass-produced conformists whose imaginations had been bludgeoned out of them somewhere between first grade and grad school. It wasn't that they were ignorant. It's just that they were stupid from all that pounding.

How fortunate he had been to be a sickly child, who had to be educated largely at home. His learning had been haphazard, but in the long run he had learned more, really *learned* more, than his school-going peers. He'd had time to think a little, develop a little wisdom along with his knowledge. Later in life his health had improved so he could attend regular classes. But the important thing was that during the earliest, most vulnerable, formative years, he had largely escaped the molding process. He could work with chemicals, and despite knowing the laws that governed their reactions, still appreciate the magic of them, still perceive the infinite possibilities inherent in them. He could look in a test tube and imagine miracles; and not just imagine—he could also feel, with profound certainty, that he could actually perform those miracles, given the necessary covert moments and equipment. The strictures of conventionality which extinguish wonder and make everything familiar appear mundane did not imprison his mind. He knew the true secret of the universe; the mundane is *not* reality.

The liquid in the flask was warm. The rounded base fit comfortably in his hand. He held it a moment, feeling an odd, sensuous thrill. He reached for the stoppers; rejected the neoprene, and chose the common cork. With the flask stoppered, he brought out his briefcase and packed the flask into the place he had prepared, careful to see that it rode right side up. The heavy padding was probably unnecessary, but taking every precaution was his style. He had respect for Murphy's Law.

With the briefcase in hand he started out the door, remembering only when a chill draft touched him that it was winter in Midland. He set the briefcase down and donned his

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coat, a heavy fur-lined thing that made him think of a toga with a hood. When he walked to the exit, he felt like a senator from ancient Rome out on an inspection tour of the northern provinces.

This particular northern province was cold. As he stepped outside, a bitter wind raked at his face. He hoisted the parka hood up over his head and drew it tight at his chin. Mercury vapor lamps cast their chill glare over everything, and windblown snow-powder billowed over the snow-dunes, making it seem as if a light snow were still falling. The ice crystals added teeth to the wind. He turned so his face would be away from the savage beast and set out.

"For this I left California?" he muttered, thinking darkly that Michigan should be evacuated in the wintertime.

A cold, wetting contamination in his shoes made him clench his teeth. Some day maybe he'd remember to bring his boots. It galled him as a compromise of his principles, but he amended his course to walk in the area where all the other footprints were, taking advantage of the beaten-down path. (He hated to take the beaten path.)

His car was at the end of what had been a long row of cars when he'd come in at 4 PM that afternoon, but now was mostly empty, snow-covered pavement. As he trudged through the snow, an arthritic twinge in his left big toe reminded him painfully that he was no longer on the uphill side.

The electrocar was like a refrigerator. The upholstery was so cold it stung him even through his coat. Desperately he turned on the little gas-powered heater, and then basked in the warm blast it put out. When he figured he was thawed out enough to move, he secured the briefcase upright with the passenger side lap and shoulder belts.

The instrument panel indicated that the insulated batteries were still in the optimum temperature range, and he grunted with satisfaction. Presently he backed the car out crunching through the snow, and drove off into the night, the silent-running car making no noise except for the snowslush swishing under the tires.

At this time of night (actually it was early morning—he glanced at his watch) the streets in this area on the outskirts of town were virtually deserted. The snow began to fall again, big fluffy flakes that mingled with the fine, wind-driven powder, and a sense of isolation closed about him like a blanket. Without realizing it, he fell into a kind of reverie.

Through the camouflage of falling snow he idly noticed a glimmer of red light up ahead. But there seemed to be little point in stopping for the traffic signal. No one else would be out here but him. He was alone, all alone, as he always had been—

The other car hit him broadside. It seemed to come out of nowhere, with the snow obscuring sight until the last moment. The last things he remembered were his despairing lunge for

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the briefcase, a loud thudding sound, a dreamlike whirling motion, and the cold—the terrible, terrible cold.

When he came to, he shivered, then stopped, because he realized he was no longer cold. He fought his eyes open, and waited while the blurriness slowly gave way to sharp focus. Despite the dim illumination, he could see that he was in an austere, aseptic environment, and in a bed with a sheet over him. Realizing he must be in a hospital, he sighed with relief. He had lived. His life wasn't over. There was still a tomorrow. But then he frowned as a sense of guilt settled over him. What about the person or people in the other car? What had become of them? They might be dead! And he had killed them. The accident had been his fault, he knew. But it had been so unlikely. It was an accidental accident, he tried to explain to his conscience. His conscience was not impressed.

Suddenly he had to move, shift position, do something, anything to distract himself from thinking. He tried to squirm, but nothing happened. His arms seemed to be strapped to the sides of his body. His legs seemed to be encased in concrete. What was wrong? Had they tied him down? Or—the horrible thought came—was he paralyzed? He closed his eyes and groaned.

A nurse came from somewhere, her uniform swishing crisply. He turned his head and looked at her. "Well?" he demanded.

She blinked. "Well, what?"

"Well—whatever is customary. I mean, isn't there something you generally say to a patient who just regains consciousness—like informing him of what happened to him while he was out of it? What injuries he suffered? What his future prospects are?"

The nurse cleared her throat. "You should wait until your condition is a little better. What you need now is rest. You still have a lot of recuperating to do. Conserve your strength. Let me get you a sleeping pill."

"I don't want a sleeping pill. I want to know the present state of affairs. The full state of affairs. Why can't I move my arms or legs?"

She shook her head. "Rest. Dr. Lansky can answer your questions for you when he checks on you in the morning." The period at the end of her sentence was meant to be imposing. She turned and began to walk away.

"Nurse," he said quietly.

She paused, her pert young figure framed in the doorway, and glanced back at him with pale blue eyes. "I'll get you that pill—" she began.

"Nurse," he persisted. "Do I even *have* arms and legs anymore?"

For a fleeting instant, the look on her face was tragic. Then she blanked her face. "Dr. Lansky can answer your questions in the morning," she repeated. There was a very slight tremor in her voice. She left, and did not return.

So that was it, he thought dismally. He was a basket case! A quadruple amputee! Make that a quintuple am-

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putee—no arms, no legs, no future! A dark gloom of despair settled over him. And with it, oddly enough, came a mystifying feeling of satisfaction. He searched for the cause, and found it when he realized his conscience was now still. Whatever may have happened to the occupants of the other car, he had atoned, and would be atoning, for the rest of his miserable life.

In the morning, a blond-haired blue-eyed man in his fifties came to his bedside. He said he was Dr. Lansky, and Lyttle grimaced, in lieu of a shrug which would have hurt too much. The doctor was truthful and frank, confirming his suspicions. He began to talk about bionic prosthetic devices, but Lyttle knew he could never afford them. They were still experimental, anyway, and they both knew it. Lansky quickly dropped the subject once he'd given the standard spiel.

There was compassion in the doctor's voice as he spoke—a carefully measured compassion. A reserve seemed to veil his eyes, as if he were keeping a barrier between himself and his patient. That was understandable, if not forgiveable. Doctors see so much suffering, they must keep from becoming emotionally involved with each patient. But that meant Lansky was seeing him as a statistic, or as "the patient in room—" whatever the room number was.

He understood, but still felt resentful, and was glad when the doctor left.

It seemed that the flask of amber liquid in the briefcase didn't matter any more. But just to have something to make sound about, he inquired about the briefcase later.

The nurse (a different nurse—he never saw the first one again) nodded, to his surprise. "It's with your personal effects. We're keeping it for you."

He looked up with new interest. "You mean it's intact? It survived the crash intact?"

She smiled a little rueful smile for his benefit. "It's about the only thing that did."

Her attempt to lighten his spirits went past him. "Where is it?"

"In the cupboard, with your wallet and keys and things," she replied, pointing. "Was there something special in it?"

He nodded. "A flask."

"A—flask?" the nurse repeated, puzzled.

"Yes—say, would you see if it's still there? Please?"

She shrugged and complied. The briefcase was scratched and scuffed, but still unbroken. She opened it after a moment of fumbling.

"Oh—yes, here's your flask. It's not broken!" she exclaimed in mild surprise. Then she added, "Well, you did have it pretty well padded in there." She cocked a suspicious eyebrow at him. "What's in it? Looks like urine." She wrinkled her nose.

He smiled. "Ginseng tea," he lied. "Nurse—do you suppose you could give me a little swig?"

She shook her head and began to replace the flask in the briefcase.

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"Now really, you know that sort of thing wouldn't be good for you in your condition. You've just come out of shock!"

"Ginseng tea?"

She smiled knowingly. "Sure it is."

"Oh. Oh!" He laughed. "Oh no, nurse, it's not alcoholic. Honest. I swear. Take off the cork and sniff it for yourself, if you don't believe me."

She eyed him narrowly, then removed the cork and sniffed. "It doesn't smell alcoholic," she conceded. "But even so, tea would be spoiled by now. It's been five days."

He thought quickly. "Uh, no, there's no sugar in it. I like my Ginseng tea unsweetened. It'll keep—at least for five days."

The nurse bowed her head a moment, apparently torn with indecision. "I shouldn't let you have anything not on your prescribed regimen—" she began slowly.

"Please, nurse," he urged her. "I won't say I have faith in all the claims made for it, not that it could do much to help me anyway, but I do rather like it. And besides," he looked at her now solemnly, "this will probably be the last chance I get to have any for a long time. . . ." He let his voice trail off.

She hesitated a moment longer, then gave in. "I suppose it won't hurt," she muttered. She gave him his swig.

Of course, it tasted awful, and he had to pretend he liked it. He didn't want her to become suspicious—they could still pump his stomach. Finally when he'd had all he could stand, he forced a smile and said, "Thank you—that's enough for now. Save the rest for later. Okay?"

She nodded and put it away.

He thanked her, then closed his eyes. There was nothing to do now but relax, and await whatever might come to pass.

Linda Channing braced herself before opening the door. There was something especially disquieting to her about a quadruple amputee. A man without arms and legs—she shut off the thought. No, she told herself, think of him as "the patient in room 353." Or even better, simply as "353." But then she reminded herself, she had been told to try to boost his morale. You can't do that with a number. She had to think of him as a person. She felt resentful for a moment.

The resentment faded into a sense of guilt. Giving him that drink out of his flask had been entirely wrong. If Dr. Lansky knew, he'd probably complain so loudly she'd be put back washing bed pans again. She had let him intimidate her, she conceded. Lying there in bed limbless, he had been an object that revolted her. And feeling ashamed of that revulsion, she had allowed herself to be manipulated in overcompensation.

She had to look in on him before she went off duty, to make sure he was all right. She had to assuage her conscience. If everything was fine, and no harm done, then the matter could end there, of course.

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Quietly, she opened the door and peeked in. The patient was lying there peacefully, sleeping. Something didn't look quite right. Heart thumping, she approached the bed. What was it that was bothering her? Suddenly her eyes widened. The shape under the sheet didn't look right. For a moment she was transfixed, disbelieving. But terror and guilt drove her on. Breathlessly she raised the sheet and stared.

When she dropped the sheet and took a step backward, she had to put her hand in her mouth and bite down to keep from screaming. What had she done?, she railed at herself miserably. She closed her eyes and shuddered, then opened them again. No matter what the consequences to her, she had to tell the doctor. Silently she slipped back out of the room and closed the door, leaning against it for a moment, heart pounding and tears starting.

Something was happening that she didn't understand, something drastic. She had to get help. She broke into a run, her heels clacking clamoring through the corridor.

"Dr. Timothy Jamieson," the fuzz-cheeked young man introduced himself.

Cal Hartridge smiled. "Around here, we dispense with the formality of titles and such, Tim."

Abashed, Jamieson nodded. "Uh—is this where I'll be working?"

Hartridge gestured in introduction to the lab. "This is your lab," he confirmed. "Ray Lyttle used to work here. He's the one who had the accident and all. I imagine you heard of him."

The youth's eyes grew large. "I'll say. So he worked here!" He looked around. "Is this where he developed that formula of his?"

"We believe so. At least, that's what the company is claiming—that he developed it right here, on company time, with the facilities you see right here."

Jamieson shook his head and looked back at the older man. "Is it all really true, what I read in the news printouts? He actually—*regrew* his amputated limbs?"

Hartridge nodded soberly. "It's true, all right. That formula he drank seemed to trigger the regeneration mechanism that normally is pretty well dormant in mammals."

After a moment of thought, Jamieson observed, "You know, it sure seems like an astounding coincidence. That he was working on that formula, and happened to have it with him when he needed it."

"Actually, it was serendipity."

"What do you mean?"

"Ray's notes say he intended the formula as a sort of elixir of life—corny as that may sound. You know, something to restore youth. He had the idea that what human body cells need to do in order to be renewed, is undergo conjugation, where nuclei of two cells exchange chromatin material—something like paramecium do. So he developed this chemical agent that would stimulate human body cells into doing this."

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Here he paused, frowning, and shook his head. "Problem was, previous formulas he'd tried had succeeded in doing this with test animals he kept in his apartment, but had also made the body cells undergo uncontrolled mitosis, and become cancerous. And you see, he hadn't had time yet to test his latest formula. He was taking it home with him to do that when he had the accident. So, if you ask me, he took a mighty big risk."

"But it did work."

The older man shrugged. "It did cause him to regenerate his limbs. But he was just lucky it didn't turn him into one big, cancerous blob!"

Then he added thoughtfully, "Who knows? Perhaps the stuff he concocted is the elixir of life. Maybe you could go on living forever if you took the stuff every forty years or so. But there is the one drawback."

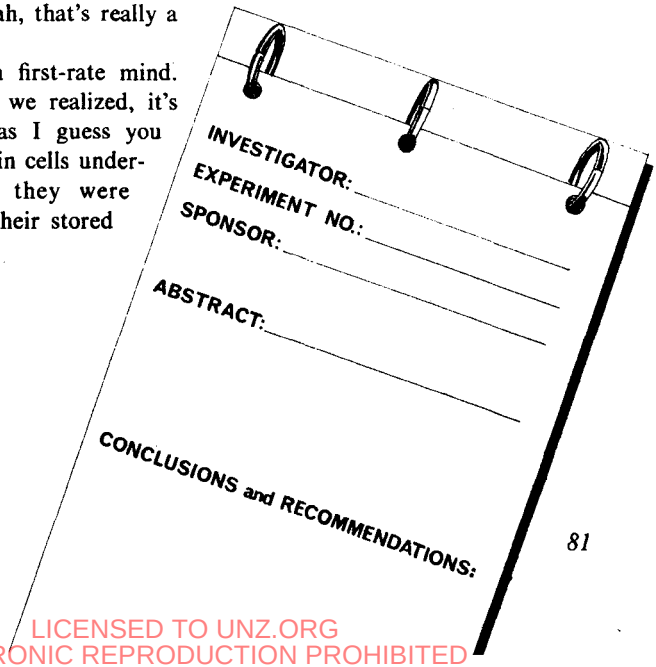
Jamieson nodded soberly. "You mean his brain. Yeah, that's really a shame."

"It is. He had a first-rate mind. More brilliant that we realized, it's obvious now. But as I guess you heard, when his brain cells underwent conjugation, they were wiped clean of all their stored information. He wound up with the mind of a newborn infant!"

The youth shuddered. "Can he be reeducated?"

"Oh yes, we believe so. In fact, the company has undertaken to do that very thing. That is—we're underwriting the cost, and all. He has to be started all over again, right from the beginning. But we'll see to it that he gets the best education possible, carefully and rigorously structured according to the best modern educational techniques." He smiled proudly.

"Yes," he concluded, "We don't think it will prove to be a permanent loss. We intend to get back that brilliant, imaginative mind. In fact, maybe he'll be even better. I understand that Ray was sickly as a child, and missed school a lot. He overcame a considerable handicap in that regard, seems like. We'll make sure he gets the proper training, this time." ■



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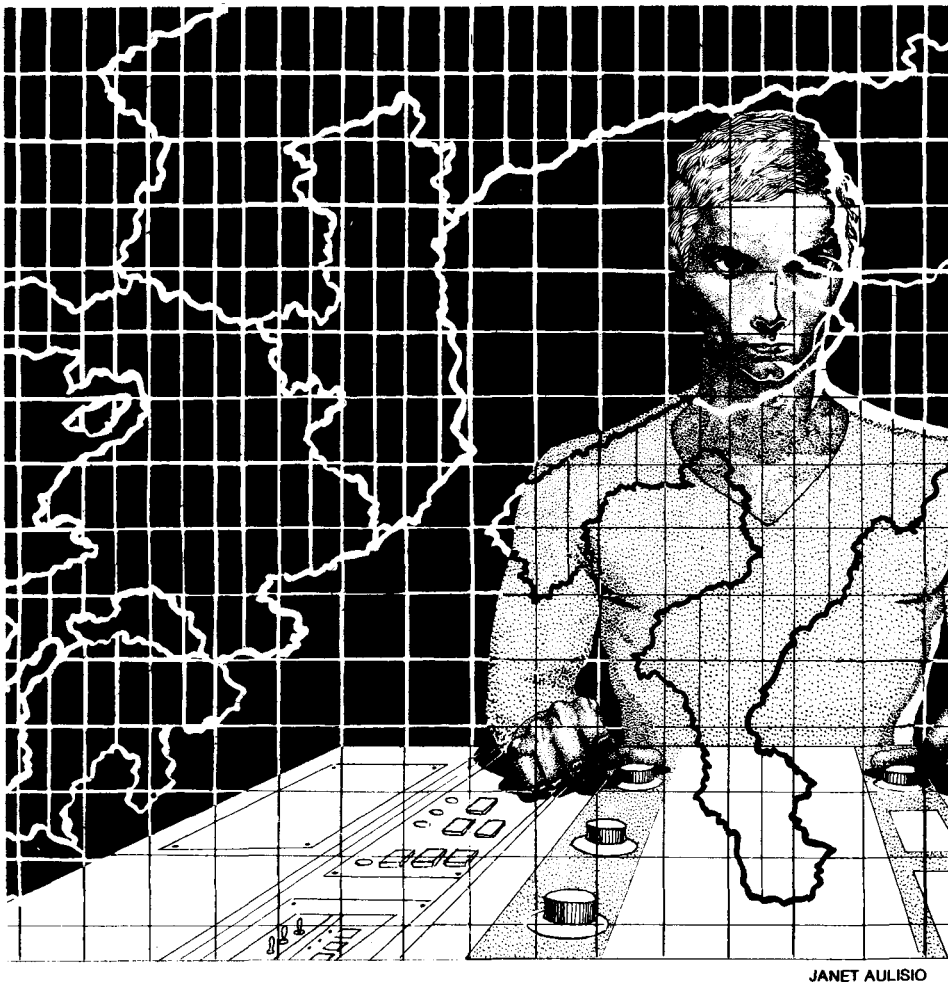

JANET AULISIO

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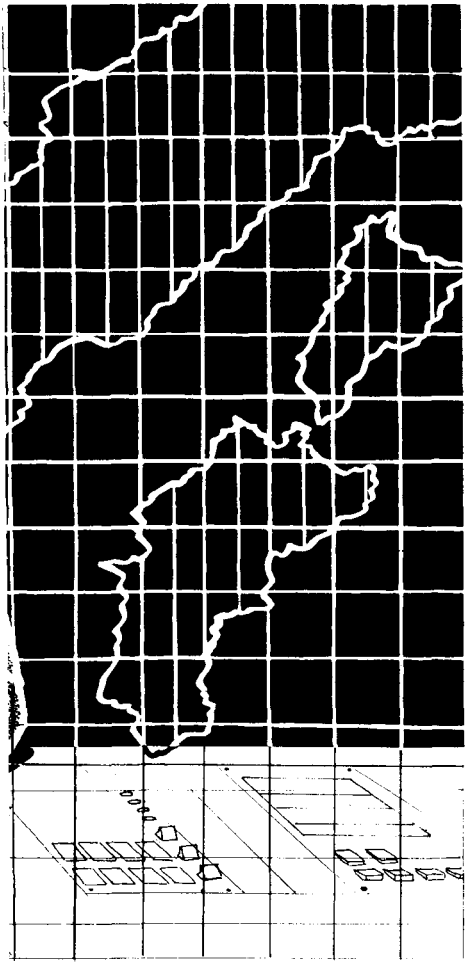
ORSON SCOTT CARD

BREAKING THE GAME



"It matters not if you win or lose, but how you play the game." Oh yeah? Oh yeah!

Herman Nuber's feet were asleep, and every time he shifted his weight they tingled unbearably.

"My feet are asleep," he complained to the sleeproom attendant.

"Happens all the time," answered the attendant, reassuringly.

"I was under for three years," Herman pointed out. "Was the circulation to my feet cut off all that time?"

"It's the somec, Mr. Nuber," said the attendant. "It makes your feet feel that way. But your circulation was never cut off."

Herman grunted and went back to reading the lists on the wall. His feet tingled a little less, and now he began to shift his weight back and forth. The news sheet was boring. Same list of victories for the Empire, victories that half the time left the enemy in possession of the star system with a few Empire ships able to limp home. The gossip sheets were almost as boring. All the big-name lifeloopers screwing their way to fame and fortune. One

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looper committed suicide—a novelty, since people who wanted to take themselves out of circulation usually just signed up for the colonies.

The list he studied was, of course, the game sheet. He skimmed down to the International Games list, and there was the notice.

Europe 1914d, now in G1979. Biggest news this week is that Herman "Italy" Nuber is up on Thursday, so all non-Italy players, watch out!

Very flattering, of course, to be named by the waking lists. But it was to be expected. The International Games had been around for years, dating back to well before somec. But there had never been a player like Herman Nuber.

He left the sleeproom, pausing, almost as an afterthought, to dress. This waking would be for only six months—last time he had won more money than usual on the side bets, which were strictly illegal but a very safe, pleasant investment. No one gave long odds against him—when he placed bets on himself the rate of return was only seventeen percent. But that was better than a savings bank or government bonds.

"Herman," said a quiet man, even shorter than Herman Nuber.

"Hi, Grey," Nuber said.

"Good waking?"

"Of course." Grey Glamorgan was a good business manager. He always remembered that even though he was something of a financial genius, with many good connections, he was *not* in business for himself. Trustworthy. A born underling. Herman liked to surround himself with men who were shorter than himself.

"Well?" asked Grey.

Herman looked unconcerned. "Buy Italy, of course."

And Grey nodded. It was a kind of ritual, but the game laws specified that a place in the game could only be purchased when the player was awake—there must always be a waking player at the computer.

Well, I'm awake, Herman thought. And unless things had changed considerably, this was the waking when he'd make the grand play—to end the game by conquering the world.

The computer wall was already warmed up when he got to his flat—another thoughtful gesture from Grey. Herman tortured himself as he always did, ignoring the screen, refusing to look at it, pretending the computer wasn't waiting for him as he toured the flat, made sure all the arrangements were correct. Herman wasn't really rich; only mildly well-to-do. He couldn't afford to keep an empty flat while he was under. His belongings were stored, instead, or sold each time. Someday, though, I'll be rich enough, he thought. Someday I'll get to the really high somec levels, like five years under for three months up. And I'll own a flat, not just lease one for a waking.

It was everyone's dream, of course. Everyone's plan. And one out of every seven million people in the Empire made it. Horatio Alger is alive and well forever.

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At last, orange juice drunk, bed bounced on, woman for the night paid for and picked out, toilet used, he allowed himself to settle down comfortably in the chair before the computer module. But still he kept the screen dead. He punched out the code for Europe 1914d.

He had been twenty-two when he had first decided to invest some of his money in the expensive hobby of International Games. It had cost him two months' salary, and he had only been able to buy a third-ranked position in Italy in the start of a new game. He had chosen Europe 1914, even though it was the fourth game of that name, because he had specialized in twentieth-century strategies in his small-game playing. And now, with an interplanetarily broadcast game, he'd have a chance to see if he was really as good as he had thought.

I *am* that good, he reminded himself now, flashing on the holo. The globe appeared before him, and he studied it. First the weather patterns shown; then the political map.

"How is it?" asked Grey, appearing quietly behind Herman.

"Lovely. No one has tried anything rash. Good caretakers."

Italy showed up as pink on the map. Herman remembered the beginning—an Italy newly united, weak, unsure whether to join Germany and Austria-Hungary. In the real twentieth century, no one of any force had emerged in Italy until after the 1914 War. No one until the nincompoop Mussolini. But in Europe 1914d, Italy had Herman Nuber, and even though he was a third-ranked player, he had bet quite a bit on himself—and on Italy.

It was three years before his daytime work earned Herman enough money to go on somec for the first time. In that time he had married, had a daughter, and divorced. No time for marriage. She didn't like it when he spent all night on the game. But it had been worth it, in the long run. A bit painful, some emotional scenes, but at the end of the three years, Herman's bets paid off. Forty to one. He had driven out other, less skillful players, and when he went under somec, he did it as dictator of Italy, and Italy had turned savagely on Austria-Hungary, brilliantly defeated the Prussian army (oh, no, actually *German*, he reminded himself. Have to keep the periods straight) near Munich, and a peace treaty had been signed. America never joined the war, much to the chagrin of the players who had paid heavily for that choice position, only to see it become useless in the real game.

Italy, then, had been the major power in eastern Europe. But now, Herman saw with a smile, Italy *was* Europe, the entire continent pink, and most of Asia as well. His last waking had been the consummation of the struggle with Russia. And now Italy stood poised on the Pacific, on the Indian Ocean through Persia, and on the Atlantic, ready to try for everything.

"Looks very good, doesn't it?" Herman asked Grey, who was still silent.

"For the Italy player, it does," said

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Grey, and Herman turned in surprise. "You mean you didn't buy it?"

Grey looked a little embarrassed. "Actually," he said, "I was afraid of this."

"Afraid of what?"

"Someone's apparently been speculating in Italy. My staff gave me the report when I came up three weeks ago. Someone's been buying and selling Italy in closed bids ever since you went under last."

"That's illegal!"

"Weep, then. We've done it ourselves, you know. Shall we call in an investigation? All the books open?"

"Why didn't you get a good proxy and keep it?"

"They pulled it off again, Herman. The bidding was last night at midnight. Not precisely prime time. But I placed my bid. Frankly, it was ridiculously high. But no taker. The player who got it bid twice what I did."

"Then you should have bid higher still!"

Grey shook his head. "Couldn't. I only have fifty percent power of attorney, remember?"

Herman gasped in spite of himself. "Fifty percent! Grey, fifty percent? It was more than fifty?"

Grey nodded. "More than fifty liquid, anyway. I couldn't match it. Not from your funds. And I just didn't have enough loose money around to add any of my own."

"Well, who's the player?"

"Believe it or not, Herman, it's an assistant minister of colonization, a real flunkie. It's his first time in the broadcast games. No record at all. And no way he could have the money to buy that place in the game himself."

"Find out who the organization is, Grey, and buy that position."

Grey shook his head. "I don't have enough money. Whoever's buying it is serious, and they've got more money than you."

Herman felt weak and cold. This was not expected. Of course there were always speculators in the games. But Herman always paid well for his position, and because he had contributed most to the slot, when he was awake no one could buy Italy but him, as long as he offered at least fifteen percent over the last purchase price. But now the purchase price had been more than half his wealth.

"It doesn't matter," Herman told Grey. "Borrow. Liquidate. I'll give you ninety percent power of attorney. But buy Italy."

"What if they won't sell?"

Herman leaped to his feet, so that he towered (delicious!) over Grey. "They can't! They can only sell to me. They have to be speculating on stripping me. Well, let 'em. This time Italy takes over the world, Grey. And the bets won't be just seventeen percent. We'll be in for the long odds. Do you understand?"

"They don't have to sell to you, Herman," Grey said. "The player who has it isn't on somec."

"I don't care. I'll outlast them. They have to quit sometime. Pay their price. They have a price."

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Grey nodded, unsure. Herman turned away, and heard Grey shuffle softly through the carpet as he left. Herman switched on the screen as his stomach churned. Italy was valuable, but only because of Herman Nuber. Only a genius could have taken that second-rate country and made it a world power. Only Herman Nuber, the greatest International Game player in history, dammit. They're just trying to rob me, Herman concluded. Well, let 'em.

And then, though he knew it would torture him, he flashed the screen through to a close-up of current military operations by the Italian Empire. There was a border skirmish in Korea. India was becoming hostile. The Italian agents were doing well at subverting Japanese rule in Arabia.

Everything's perfect, Herman said softly. In three days I can have this game flying. In three days, if I can once get Italy.

Grey didn't come or call all day. By evening, Herman was a nervous wreck. He had already had to watch as three perfect opportunities for quick, decisive action had been missed by the idiot playing Italy. Of course, that kind of thing happened all the time when Herman was on somec—but he was asleep, he didn't have to watch. And still Grey didn't come.

The buzzer. Not Grey, since the door opened to his hand. Must be the woman. Herman stroked the release strip and the door opened. She was young and had a beautiful smile. Just what the doctor ordered.

At first, because she was beautiful and cheerful and good at her job, Herman forgot the game, or at least was able to concentrate on something else. But then, even as she tried to arouse him again, the pent-up worry flooded back, and he sat up on the bed.

"What's wrong?"

Herman shook his head.

"Too tired?"

Good a reason as any. No reason to pour out your heart to an edna.

"Yeah. I'm tired."

She sighed, leaned back again on the pillows. "Don't I know it. I get tired, too. They give me shots so I can keep going for hours, but it's so nice to get a breather."

A talker. Damn. "Want something to eat?"

"We aren't supposed to."

"Diet or something?"

"Naw. Sometimes they try to drug us."

"I won't drug you."

"Rules are rules," the woman insisted. The girl, rather.

"You're pretty young."

"Working my way through college. I'm older than I look. But they can rent me juvenile, too, so we all get more money."

Money money money. Pay for sex and you get a treatise on the state of the economy. "Look, kid, why not go now?"

"You paid for all night," she said, surprised.

"Fine. You were wonderful. But I'm tired."

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"They don't like giving a refund."

"I don't want a refund."

She looked doubtful, but when he started dressing, so did she. "That's an expensive habit," she said.

"What is?"

"Paying for love and then not using up what you pay for."

"Well, right," Herman said, then added wryly, "wouldn't want any extra love lying around, would we?"

"Everybody's a comic," she answered, but even at that the habits of the trade stayed. It was sexy, her smile and her tone of voice, and for a moment he wondered if he really wanted her to go. But then he thought of Italy and decided he'd rather be alone.

She kissed him good-bye—it was company policy—and then left him alone. He sat up all night, watching Italy. The imbecile was letting things go. He could have had Arabia around three in the morning. But instead, he made a ridiculous peace treaty that actually gave up land in Egypt. Stupid! By morning, Herman had fallen asleep, but he woke with a headache and called Grey.

"Dammit, what's happening?" Herman demanded.

"Herman, please," Grey said. "We're working hard here."

"Yeah, and I'm just sitting around here watching Italy turn to crap."

"Didn't you get an edna tonight?"

"What the hell business is that of yours?" Herman snapped. "Buy Italy, Grey!"

"This Abner Doon, the assistant minister of colonization, he's pretty adamant."

"Offer him the moon."

"It's already owned. But I offered him everything else. He just laughed. He just told you to watch the game and you'd see a real genius at work."

"Genius! The man's a moron! Already he—" and Herman launched into a description of the stupidities of the night before.

"Look, I'm not into International Games," Grey finally said. "You know that, that's why you hired me. Okay? So let's just have me do my job and *you* follow the scoreboard."

"So when are you going to do your job?"

Grey sighed. "Do we have to do this on the phone, with Mother's Little Boys listening in?"

"Let 'em listen."

"All right, I've tried to trace who's controlling this Doon. The man has connections, but they're all legitimate. I can't find a bankroll, all right? So how can I get the people who are paying him to sell out if I can't find who's paying him?"

"Can't he have an accident or something?"

Grey was silent for a moment. "This is the telephone, Mr. Nuber, and it's illegal to suggest criminal activities over the telephone."

"Sorry."

"It's also very stupid. Do you want me to lose my license?"

"They don't listen to every conversation."

"All right, keep praying. But we

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don't do anything criminal. Now sit and watch the holo or something."

Herman punched off the phone and sat at the computer terminal. Italy had just launched a pointless, half-assed war in Guiana. Guiana! As if anything that happened there mattered. And it was such a naked act of aggression that the alliances were starting to form against Italy. Stupid!

He had to do something to take his mind off the delay. He punched in a private game, offered it for free for any taker, normal specs, and pretty soon he had a good five-man game of Acquitaine going. He won it in seven hours. Pathetic. The great players were all on the broadcast games. What's keeping Grey?

"Nothing's keeping me," Grey insisted when he finally came to Herman's flat that night. "I'm performing heroic tasks for you, Herman."

"Swinging on vines isn't doing a damn bit of good."

Grey smiled, trying to like Herman's sense of humor. "Look, Herman, you're my biggest client. And you're famous. And you're important. I'd have to be an idiot not to be doing my best for you. I've got three agencies out researching everything about this Doon. And all we can find out is that he's nothing like what we first thought."

"Good. What do we think now?"

"He's rich. Richer than you could imagine."

"I can imagine infinite wealth. Give me credit."

"He's got connections all over Capitol. He knows everybody, or at least knows the people who know everybody. Right? And all his money is in trusts and investments in dummy corporations that own dummy banks that own dummy industries that own half this damn planet."

"In other words," Herman said, "he's self-employed."

"Self-employed but he ain't sellin', you see. He doesn't need the money. He could lose everything you own in pinochle and still like the guy who won it."

Herman grimaced. "Grey, you sure have a way of making me feel poor."

"I'm trying to tell you what you're up against. Because this guy's twenty-seven years old. I mean, he's *young*."

But something didn't fit. "I thought you told me he wasn't on somec."

"That's the craziest thing, Herman. He isn't. He's never gone under at all."

"What is he, a religious fanatic?"

"His only religion seems to be wrecking your life, Mr. Nuber, if I may be so bold. He won't sell. And he won't tell why. And as long as he doesn't go on somec, he doesn't have to sell. It's as simple as that."

"What have I ever done to him? Why should he want to do this to me?"

"He said he hoped you wouldn't take it personally."

Herman shook his head, furious and yet unable to find a reason adequate for his fury—or an adequate way to express it. The man had to be reachable.

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"You know what I said over the phone?"

"You'd be the first suspect, if anything happened to him, Herman," Grey warned. "And it wouldn't help a bit. The game would end for the duration of the investigation. Besides, I'm not in that business."

"Everybody's in that business," Herman said. "At least scare him. At least rough him up."

Grey shrugged. "I'll try it." He stood up to go. "Herman, I suggest you go back into business for a while. Make a little more money, get the feel of it again. Meet some people. Try to get the game out of your system. If you don't play Italy this time, you can play it on your next waking."

Herman didn't answer, and Grey let himself out.

At three o'clock in the morning, Herman, exhausted, finally slept.

At about four-thirty, he was wakened by the alarms going off in his flat. He groggily pulled himself out of bed and staggered to the door of his bedroom. Alarms were pro forma—no one of his class was ever burglarized, at least not while the residents were at home.

His worries about theft were soon dispelled, however. The three men who came in all carried small, tight leather bags, filled with something hard. How hard they were Herman wasn't eager to find out.

"Who are you?"

They said nothing, just approached him silently, slowly. He realized that he was cut off, both from the front door and the emergency exit. He backed into the bedroom.

One of the men reached out a hand, and Herman found himself crushed against the doorjamb.

"Don't hurt me," he said.

The first man, taller than the others, tapped Herman's shoulder with his bludgeon. Now Herman knew how hard it was. The tapping continued, getting harder and harder, but the rhythm was steady. Herman stood frozen, unable to move, as the pain gradually increased. And then, suddenly, the man shifted his weight, swung the bludgeon backhand, and Herman's ribs were smashed. The breath left him in a grunt, and pain like great hands tearing apart his insides swept up and down his body.

The agony was unbearable.

They were just beginning.

"No doctors, no hospital, nothing. No," Herman said, trying to summon a forceful tone of voice from his battered chest.

"Herman," Grey said, "your ribs may be broken."

"They aren't."

"You're not a doctor."

"I have the best medical kit in the city, and it said that nothing was broken. Whoever those bastards were last night, they know what they're doing."

Grey sighed. "I know who those bastards were, Herman."

Herman looked at Grey in surprise, almost rising from the bed, though the pain stopped him as abruptly as if he

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were strapped down.

"They were the men I hired to rough up Abner Doon."

Herman moaned. "Grey, no, it can't be—how could he have talked them out of it?"

"They had an ironclad contract. They've worked for me before. I have no idea how Doon subverted them." Grey looked worried. "He has power where I didn't expect it. They've been offered money before—a lot of money—but they always kept their contracts. Except when I hired them to teach Doon a lesson."

"I wonder," Herman said, "if he learned anything."

"I wonder," Grey added, more to the point, "if *you* did."

Herman closed his eyes, hoping Grey would drop dead.

"Forget the game. Buy Italy next time. Doon's got to go under somec sometime."

Herman didn't open his eyes, and Grey went away.

The days passed, and soon Herman was able to hobble back into the room where the computer screen dominated one wall, where the holo of the world of Europe 1914d rotated slowly. Whatever Doon's motive was, Herman saw countless proofs of the fact that Doon knew nothing about playing International Games. He didn't even learn from his own mistakes. The forcible occupation of Guiana was followed by a pointless attack on Afghanistan, which had already been a client state, driving several other client states to the enemy alliance. But Herman's rage finally faded, and he glumly watched as the position of Italy worsened.

Italy's enemies weren't particularly brilliant. They could have been defeated—could still be defeated, if only Herman could get to play.

It was when a revolution flared in England that Herman began to rage again.

From the beginning of the game, Herman had established a carefully benign dictatorship as the government of the Italian Empire, with local autonomy on many matters. It was not oppressive. It was guaranteed to eliminate any chance of revolution. Any rebellions were ruthlessly suppressed, while territories that didn't rebel were lavishly rewarded. It had been years since Herman had had to worry about the internal politics of Italy.

But when the English revolution began, Herman began to scan Doon's activities in the internal affairs of the empire. Doon had pointlessly changed things, taxing the populace, emphasizing the difference between the rich and poor, the powerful and the weak. He had also oppressed local nationalities, compelling them to learn Italian, and the computer had brought the inevitable result—resentment, rebellion, and at last revolution.

What was Doon doing? Surely he could see the results of his actions. Surely he could tell that he was doing everything—or at least something—wrong. Surely he would realize he was out of his class in this game, and sell

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Italy while he still could. Surely—

"Grey," Herman said over the phone, "this Doon. Is he stupid?"

"If he is, it's the best-kept secret on Capitol."

"His game is too stupid to be believed. Totally stupid. He's doing everything wrong. Anything that could be done right, he's done the opposite. Does that sound like him to you?"

"Doon's built up a financial empire from nothing to the largest I've ever heard of on Capitol, and done it in only eleven years since his majority," Grey answered. "That doesn't sound like him."

"Which means that either he's not playing the game himself—"

"No, he's playing, that's the law and the computer says he's following it—"

"Or he's deliberately playing to lose."

Grey's shrug was almost audible. "Why would anybody do that?"

"I want to meet him."

"He'll never come."

"On some neutral ground, someplace that neither of us controls."

"Herman, you don't know this man. If you don't control the ground, he does—or will, by the time a meeting took place. There is no neutral ground."

"I want to meet him, Grey. I want to find out what the hell he's doing with my empire."

And Herman went back to watching as the revolution in England was put down brutally. Brutally, but not thoroughly. The computer showed armed bands still roaming in Wales and the Scottish highlands, and urban guerrillas still alive in London, Manchester, and Liverpool. Doon could see that information, too. But he chose to ignore it. And chose to ignore the revolutionary movement gaining force in Germany, the brigands harassing the farmers in Mesopotamia, the Chinese encroachments in Siberia.

Asinine.

And the fabric of a well-wrought empire began to come apart.

The telephone sent its gentle buzz into the flexible speaker in his pillow, and Herman awoke. Not even opening his eyes, he said into the pillow, "I'm asleep, drop dead."

"This is Grey."

"You're fired, Grey."

"Doon says he'll meet with you."

"Call my secretary for an appointment."

"But he says he'll only meet with you if you can come to the C24b tube station within thirty minutes."

"That isn't even in my sector," Herman complained.

"So he isn't trying to make it easy for you."

Herman groaned and got out of bed, dressed in a suit that looked far from natty as he sagged out of the flat and into the corridors. The tubes were running a half-schedule at that time of morning, and Herman stumbled into one and followed the route that let him to station C24b. It was even less crowded than Herman's own area, and there on the platform waited an unpre-

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possessing young man, only a little taller than Herman himself. He was alone.

"Doon?" Herman asked.

"Grandfather," the young man answered. Herman looked at him blankly. Grandfather?

"Not possible."

"Abner Doon, colt, out of filly Sylvaii, daughter of Herman Nuber and Birniss Humbol. An admirable pedigree, don't you think?"

Herman was appalled. After all these solitary years, to discover that his young tormentor was a relative—

"Dammit, boy, I have no family. What is this, vengeance for a divorce a hundred years ago? I paid your grandmother well. *If* you're telling the truth."

But Doon only smiled. "Actually, grandfather, I don't give a damn about your liaison and lack of it with my grandmother. I don't like her anyway, and we haven't spoken in years. She says I'm too much like you. And so now when she comes out of somec, she doesn't even look me up. I visit her just to be annoying."

"A trait you seem to specialize in."

"You find a long-lost grandchild, and already you're trying to cause division in the family. What an ugly way of dealing with family crises."

And Doon turned on his heel. Since they hadn't yet discussed the game, Herman had no choice but to follow. "Listen, boy," Herman said as he trotted doggedly behind the younger man's brisk walk, "I don't know what your purpose is with my game, but you certainly don't need any money. And you're certainly not going to win any bets, not the way you're playing."

Doon smiled over his shoulder and went on walking down the corridors. "It rather depends, doesn't it, on what I'm betting on."

"You mean you're betting that you'll lose? The way you're playing, you'd never get any takers."

"No, grandfather. As a matter of fact, I'm holding bets made months ago. Bets that Italy would be destroyed and utterly gone from Europe 1914d within two months of your waking."

"Utterly destroyed!" Herman laughed. "Not a chance of that boy. I built too well, even for a games moron like you."

Doon touched a door and it slid open.

"Come in, grandfather."

"Not a chance, Doon. What kind of fool do you take me for?"

"A rather small one, actually," Doon said, and Herman followed the younger man's gaze to the two men standing behind him.

"Where did they come from?" Herman asked stupidly.

"They're my friends. They're coming to this party with us. I like to keep myself surrounded by friends."

Herman followed Doon inside.

The setting was austere, functional, almost middle-class in its plainness. But the walls were lined with real wood—Herman recognized it at a glance—and the computer that over-

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whelmed the small front room was the most expensive, most self-contained model available.

"Grandfather," Doon said, "contrary to what you think, I brought you here tonight because, for all that you've been a remarkably bad parent and grandparent, I feel some residual desire for you not to hate me."

"You lose," Herman replied. The two thugs grinned moronically at him.

"You haven't had much connection with the real world lately," Doon commented.

"More than I wanted."

"Instead you've devoted your life and your fortune to building up an empire on a shadow world that exists only in the computer."

"My Lord, boy, you sound like a clergyman."

"Mother wanted me to be a minister," Doon said. "She was always pathetically hunting for her father—you, if you recall—but this time a father who'd not desert her. Sadly, sadly, grandfather, she finally found that surrogate parent in God."

"At least I thought I'd bequeath a child of mine some good sense," Herman said in disgust.

"You've bequeathed more than you know."

The world of Europe 1914d appeared on the holo. Italy was pinkly dominant.

"It's beautiful," Doon said, and Herman was surprised by the honest admiration in his voice.

"Nice of you to notice."

"No one but you could have built it."

"I know."

"How long do you think it would take to destroy it?"

Herman laughed. "Don't you know your history, boy? Rome was falling from the end of the republic on, and it took fifteen hundred years for the last remnant to fall. England's power was fading from the seventeenth century on, but nobody noticed because it kept gathering real estate. It stayed independent for another four hundred years. Empires don't fall easily, boy."

"What would you say about an empire falling in a week?"

"That it wasn't a well-built empire, then."

"What about yours, grandfather?"

"Stop calling me that."

"How well have you built?"

Herman glared at Doon. "No one has ever built better."

"Napolean?"

"His empire didn't outlive him."

"And yours will outlive you?"

"Even a total incompetent could keep it intact."

Doon laughed. "But we're not talking about a total incompetent, grandfather. We're talking about your own grandson, who has everything you ever had, only more of it."

Herman stood up. "This meeting is pointless. I have no family. I lost custody of my daughter because I didn't want her. I don't know, and I certainly don't want her offspring. I'll be under somec in a few months, and when I wake up I'll take Italy, whatev-

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er damage you've done to it, and build it back."

Doon laughed. "But Herman. Once a country has ceased to exist, it can't be brought back into the game. When I'm through with Italy, it'll be a computer standard country, and you won't be able to buy it."

"Look, boy," Herman said coldly, "do you plan to keep me here against my will?"

"You're the one who asked for a meeting."

"I regret it."

"Seven days, grandfather, and Italy will be gone."

"Inconceivable."

"I actually plan to do it in four days, but something might go wrong."

"Of all criminals, the worst are those who see beauty only as an opportunity for destruction."

"Good-bye, grandfather."

But at the door, Herman turned to Doon and pleaded, "Why are you doing this? Why don't you stop?"

"Beauty is in the eye of the beholder."

"Can't you wait until next time? Can't you let me have Italy for this waking?"

Doon only smiled. "Grandfather, I know how you play. If you had Italy this waking, you'd take over the world, wouldn't you? And then the game would end."

"Of course."

"That's why I have to destroy Italy now—while I still can."

"Why Italy? Why not go ruin somebody else's empire?"

"Because, grandfather, it's no challenge to destroy the weak," Doon said softly.

Herman left, and the door slid shut behind him. He went back to the tube, and it took him to his home station. At home, the holo of the globe was still dominated by pink. Herman stopped and looked at it, and even as he watched, a large section of Siberia changed colors. He no longer raged at Doon's incompetence. The boy was obviously compensating for a miserably religious childhood, which he blamed on his grandfather. But no amount of talent the boy might have could possibly dismember Italy. The computer was too rigidly realistic. Once the computer-simulated populace of Italy realized what Doon's character, the dictator, was doing, the unchanging laws of interaction between government and governed would oust him. He would be compelled to sell, and Herman could buy. And rebuild all the damage.

England rebelled again, and Herman went to bed.

But he woke gasping, and remembered that in his dream he had been crying. Why? But even as he tried to remember, the dream slipped from his mind's grasp, and he could only remember that it had something to do with his former wife.

He went to the computer and cleared it of the game. Birniss Humbol. The computer summoned her picture to the screen, and Herman looked as she went through a sequence of facial expressions. She was beautiful

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then, and the computer awakened memories.

A courtship that had been oddly chaste—perhaps religion was already in Birniss's blood, only to surface fully in her daughter. Their wedding night had been their first intercourse, and Herman laughed at how it had been—Birniss, worldly and wise, so strangely timid as she confessed her unpreparedness to her husband. And Herman, tender and careful, leading her through the mysteries. And at the end, her asking him, "Is that all?"

"It'll be better later," he had said, more than a little hurt.

"It wasn't half as bad as I expected," she answered. "Do it again."

They had done everything together. Everything, that is, but the game. And it was a crucial time for Italy. He began going to bed later and later, talking to her less, and even then talking of nothing but Italy and the affairs of his small but beautiful world.

There was no other man when she divorced him, and to satisfy a whim of curiosity he looked up her name in the vital statistics bank. He wasn't surprised when the computer told him that she had never remarried, though she hadn't kept his name.

Had there been something remarkable about their marriage, so that she'd never marry again? Or was it simply that she had only trusted one man, and then found that marriage wasn't what she'd wanted—or sex, either, by extension. Her hurt had poisoned their daughter; her hurt had poisoned Doon. Poor boy, Herman thought. The sins of the fathers. But the divorce, however regrettable, had been inevitable. To save the marriage, Herman would have had to sacrifice the game. And never in history, real or feigned, had there been such a thing of beauty as his Italy. Dissertations had been written on it, and he knew that he was acclaimed by the students of alternate histories as the greatest genius ever to have played. "A match for Napolean, Julius, or Augustus." He remembered that one, and likewise the statement of one professor who had pleaded for an interview until Herman's vanity no longer allowed him to resist: "Herman Nuber, not even America, not even England, not even Byzantium compared to your Italy for stability, for grace, for power." High praise, coming from a man who had specialized in real European history, with the chauvinism of the historian for the era he studied.

Doon. Abner Doon. And when the lad had proven himself no match for his grandfather's gifts as a builder, what would happen to him?

Herman found himself, as he dozed at the computer, daydreaming of a reconciliation of some kind. Abner Doon embracing him and saying, Grandfather, you built too well. You built for all time. Forgive my presumption.

Even Herman's dreams, he realized as he awoke, even my dreams require the surrender of everyone around me. Birniss's image was still on the screen. He erased her, and began to scan Italy.

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The entire empire was being swept by revolution from one end to the other. Even in the homeland on the Italic Peninsula. Herman stared in disbelief. It had only been overnight, and suddenly all the revolutions had come at once.

It was unprecedented in history. How could the computer have been so mad? It had to be a malfunction. Many empires had faced rebellion, but never, never so general—never universal revolution. Even the army was in mutiny. And the enemies of Italy were madly plunging over the borders to take advantage of the situation.

"Grey!" Herman shouted over the phone. "Grey, do you know what he's doing?"

"How can I help it?" Grey asked nastily. "All the gamesplayers on my staff have been chattering about it all morning."

"How did he do it?"

"Look, Herman, you're the games expert. I don't even play, all right? And I've got work to do. Did you meet with him?"

"Yes."

"And?"

"He's my grandson."

"I wondered if he'd tell you."

"You knew?"

"Of course," Grey answered. "And I had his psychological profile. Do you think I would have let you meet him alone if I hadn't been sure he had no intention of harming you?"

"Not harming me? What about those walking turds he had beat me to a pudding last week?"

"Retaliation, Herman, that's all. He's a good retaliator."

"You're fired!" Herman shouted, slamming the button on the console that disconnected the conversation. And he watched grimly, hour after hour, as the loyal fragments of Italy's army attempted to cope with the mutiny and revolution and invasion all at once. It was impossible, and by late afternoon, the only pink areas on the globe were in Gaul, Iberia, Italy itself, and a small pocket in Poland.

The computer reported that Doon's persona, the dictator of Italy, had vanished, and would-be assassins couldn't put him to death. And as Rome itself fell to an invading army from Nigeria and America, he knew that now defeat and destruction were inevitable. Impossible yesterday, inevitable today.

Still he fought his despair, and sent an urgent message to Grey, forgetting that he had fired him that morning. Grey responded as deferentially as ever.

"Offer to buy Italy," Herman said.

"Now? The thing's in ruins."

"I might pull it out. I still might. Surely he's proved his point by now."

"I'll try," Grey said.

But by late evening, there was no pink on the board. The other players and the computer's ironclad adherence to the laws of public behavior had left the game no chance of Italy's rebirth. The information appeared on the status lists. "Iran: newly independent; Italy: discontinued; Japan: at war with China and India over the domination

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of Siberia. . . ." No special notice. Nothing. Italy: discontinued.

Grimly Herman played back all the information he could find in the computer. How had Doon done it? It was impossible. But for hours as he pored over the information the computer gave him, Herman began to see the endless machinations that Doon had set in motion, always postponing revolution here, advancing it there, antagonizing here, soothing there, so that when the full revolution erupted it was universal; so that when Italy's defeat was obvious, there was no lingering desire to have some fragment of it remain. He had gauged the hatred better than the computer itself; he had destroyed more thoroughly than any man had ever built. And in his bitterness at the wrecking of his creation, Herman still had to recognize a kind of majesty in what Doon had done. But it was a satanic majesty, a regal power to destroy.

"A mighty hunter before the Lord," said Doon, and Herman whirled to see Doon standing in his living room.

"How did you get in here," Herman stammered.

"I have connections," Doon said, smiling. "I knew you'd never let me in, and I had to see you."

"You've seen me," Herman said, and turned away.

"It went faster than I thought it would," Doon said.

"Glad to know something could surprise you."

Doon might have said more, but at that point Herman's self-control, overstrained that day, broke down. He didn't weep, but he did grip the console of the computer far too tightly, as if afraid that when he let go the centrifugal force of Capitol's rotation would throw him into space.

Grey and two doctors came at Doon's call, and the doctors pried Herman's fingers away from the console and led him to bed. A sedative and some instructions to Grey, and they left again. It was only mild—too much in one day, that's all. He'd feel much better when he woke up.

Herman felt much better when he woke up. He had slept dreamlessly—the sedatives did their work well. The false sunlight streamed through his expensive artificial window, which seemed to open on the countryside outside Florence, though of course in reality nothing but another flat much like his own was on the other side of that wall. Herman looked at the sunlight and wondered if the illusion was good. He had been born on Capitol—he had no idea whether sunlight really streamed into windows that way.

Under the dazzling light, Abner Doon sat on a chair, asleep. Seeing him brought a flood of feelings back to Herman—but he retained his control, and the vestiges of the drugs made him oddly calm about things, after all. He watched his grandson's sleeping face and wondered how so much hatred could be hidden there.

Doon awoke. He looked immediately at his grandfather, saw that he was

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awake, and smiled gently. But he said nothing. Just stood and carried his chair closer to Herman's bed. Herman watched him silently, and wondered what was going to happen. But the drug kept saying, "I don't care what happens," and Herman didn't care what was going to happen.

"Is it all discharged?" he asked softly, and Doon only smiled more broadly.

"You're so young," Doon said. And then, so quickly that Herman had no time (and the drug gave him no inclination) to resist, the younger man reached out and touched Herman's forehead lightly. The hand was dry, and it traced the faint lines that had begun to cleave the skin. "You're so young."

Am I? Herman thought, as he rarely did, of how old he was in real time. He had gone on somec—what, seventy years ago? At his average rate of one out of four, that meant it had been only seventeen years of subjective time since he had first been able to use the sleeping drug, the gift of eternal life. Seventeen years. And all of them devoted to building Italy. And yet.

And yet those seventeen years hadn't even been half the time he had lived. Subjectively, he wasn't forty yet. Subjectively, he could start again. Subjectively, there was more than enough time for him to make an empire that even Doon couldn't break down.

"But I can't, can I?" Herman asked, unaware that his question arose from private thoughts.

Yet Doon understood. "I've learned everything you know about building, grandfather," he said. "But you'll never understand what I've learned about tearing down."

Herman smiled wanly, the only kind of smile available to him under the drug. "It's a field of study I largely ignored."

"And yet it's the only one with eternal results. Build well, and eventually your beautiful creation, grandfather, with or without my help, eventually it *will* fall. But destroy thoroughly, destroy effectively, and what was wrecked will never be rebuilt. Never."

And the drug took Herman's fury and hatred and turned it into regret and gentle relief. Tears spun from his eyelashes as he blinked.

"Italy was beautiful," he said.

Doon only nodded.

And as the tears now began to flow smoothly onto the pillow, Herman whimpered, "Why'd you do it, boy?"

"It was practice."

"Practice for what?"

"Saving the human race."

The drug permitted Herman to smile a little at that. "Quite a warm-up, boy. What can you destroy now, after Italy?"

Doon said nothing. He just walked to the window and looked through it.

"Do you know what's going on outside your window?"

Herman mumbled, "No."

"Peasants are pressing olives. And bringing food to Florence. A lovely scene, grandfather. Very pastoral."

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"Does that mean it's spring? Or autumn?"

"Who remembers?" Doon asked. "Who cares? The seasons are what we say they are on every world in the Empire, and on Capitol we care nothing for seasons at all. We've mastered everything, haven't we? The Empire is powerful, and even the attempts of the enemy to attack us are only the annoyance of mosquitoes."

The word *mosquito* meant nothing to Herman, but he was too weary to ask.

"Grandfather, the Empire is stable. Not as perfect as Italy, perhaps, but strong and stable and with somec keeping the elite alive for centuries, what force could possibly topple the Empire?"

Herman struggled to think. He had never thought of the Empire as being a nation, like those in the International Games. The Empire was—was reality. Nothing would ever hurt it. "Nothing can hurt the Empire," Herman said.

"I can," Doon said.

"You're insane," Herman answered.

"Probably," Doon said, and then the conversation lagged and the drug decided that Herman would sleep. He slept.

"I want to see Doon," Herman told Grey.

"I would have thought," Grey answered mildly, "that you'd seen enough of him last month."

"I want to see him."

"Herman, this is becoming an obsession. The doctors say I can't let you do anything to upset yourself. If you'll just behave reasonably for a few months, we can get you back on somec and I can give you back fifty percent of your power of attorney."

"I don't like being considered insane."

"It's just a technicality. It's keeping you alive, you know."

"Grey, all I've done warn—"

"Don't start that. The doctors are monitoring this call. Herman, the Empire isn't interested in your pathetic theories about Doon—"

"He said it himself!"

"Abner Doon destroyed Italy. It was ugly, it was cruel, it was pointless, but it was legal. Now to fantasize that he's also out to destroy the Empire—"

"It's not a fantasy!" Herman roared.

"Herman, the doctors said I have to call it a fantasy. To help you see reality."

"He's going to wreck the Empire! He can do it!"

"That kind of talk is treason, Herman. Stop talking like that and we can get you declared legally sane again. But if you say things like that when you're responsible for yourself, you can be executed very quickly by Mother's Little Boys."

"Grey, whether I'm sane or not, I want to talk to Doon!"

"Herman, drop it. Forget it. It was just a game. The man's your grandson. He was hurt, he tried to hurt you back. But don't let it damage you like this."

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A Calendar of Upcoming Events

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5-7 January
CHATTACON 4 (Tennessee area SF conference) at Sheraton Downtown Chattanooga, TN. Featured Speaker—Alan Dean Foster; Master of Ceremonies—Cliff Amos. Registration $7 until 18 December 1978, $9 thereafter. Buffet banquet ($9). Art show, hucksters. Info: Chattacon 4, P.O. Box 21173, Chattanooga, TN 37421.

16-18 January
MIMI 79 (Seventh International Symposium on Mini- and Microcomputers) at Anaheim, CA. Info: Secretary, MIMI 79, P.O. Box 2481, Anaheim CA 92804.

23-26 January
Optical Data Display Processing and Storage Symposium (SPSE) at Marriott Inn, Orlando, FL. Info: R.H. Wood, Society of Photographic Scientists and Engineers, 1411 K Street NW, Washington, DC 20005.

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29 January-1 February
General Meeting of the American Physical Society at New York, NY. Info: American Physical Society, 335 East 45 St, New York NY 10017.

23-27 August 1979
SEACON 79 (37th World Science Fiction Convention) at Metropole Hotel, Brighton, U.K. American Guest of Honor—Fritz Leiber; British Guest of Honor—Brian Aldiss; Fan Guest of Honor—Harry Bell; Toastmaster—Bob Shaw. Registration $7.50 (supporting) to 31 December 1978, $15 (attending) to 31 December 1978. Info: Seacon '79, 14 Henrietta St., London WC2E 8QJ, U. K. This is the science fiction world's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition, banquet, the works. Join now and get to nominate and vote for the Hugo awards and the John W. Campbell Award for Best New Writer.

ANTHONY R. LEWIS

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*Items for the Calendar should be sent to the Editorial Offices, **four months** in advance of the issue in which you want the item to appear.*

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"Grey, tell the doctors I want to talk to Doon!"

Grey sighed. "I'll tell them on one condition."

"What's that?"

"That if they give you one meeting with Doon, you'll never ask for another."

"I promise. I only want one meeting."

"Then I'll do my best."

Grey switched off the phone, and Herman disconnected his end. The telephone now would only connect him to Grey's office. He could make no other calls. He couldn't open the door. And his computer would no longer let him watch the broadcast games.

It was only an hour before Grey was back on the phone.

"Well?" Herman asked eagerly.

"They said yes."

"Connect me then!" Herman demanded.

"I already tried. Impossible."

"How can it be impossible? He'll talk to me! I know he will!"

"He's under somec, Herman. He went under only a few days after he wrecked—after the game. He won't be awake for three years."

And with a whimper Herman disconnected the phone again.

It took five years of therapy—five years without somec—for Herman at last to admit that his fear of Doon was abnormal, and that actually Doon had never hinted that he meant to wreck the Empire. Of course Herman had said that from the beginning, as soon as he realized that was what the doctors wanted to hear. But the machines enforced truth, and it was not until the machines told the doctors that Herman was not lying when he said those things that the doctors at last pronounced him cured and Grey's staff (Grey was under somec at the time) released fifty percent of Herman's power of attorney to him. Herman promptly signed it all back and went under somec, trying to snatch back the years of somec sleep that had been taken from him while the doctors cured him of his ridiculous delusions.

For nearly a century, Doon's and Herman's wakings failed to coincide. At first Herman hadn't tried to look Doon up—the cure had taken from him, for a while at least, any curiosity about his grandson. Then he had learned to look back on the strange episode that had so changed his life without fear or anger; and he had pored over the records of the famous game. Many books had been written on it—*The Rise and Fall of Nuber's Italy* was over two thousand views long. And as he philosophically studied the structure he had built and the way it had fallen, the desire grew in him to meet his opponent and grandson. Not *again,* because the doctors had convinced Herman utterly of the truth that he hadn't seen Doon at all after the battle.

But when Herman tried to look up Abner Doon's waking schedule at the sleeproom, he was informed that Doon's wakings were a matter of state

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security. That meant only one thing—Doon was sleeping longer than the absolute maximum of ten years and waking less than the absolute minimum of four months. It meant he was in a power group inaccessible even to most government officials. And it increased Herman's desire to see him.

It was not until Herman had reached the subjective age of seventy that he finally succeeded. Centuries of Empire history had passed, and Herman followed them carefully. He read everything he could get into his computer on history—Empire and otherwise. He wasn't sure what he was looking for; but he was sure that he had never found it. And then one day his inquiry at the sleeproom brought him the information that Abner Doon was awake. They wouldn't tell him how long Doon had been awake or how soon he would sleep again, but it was enough. Herman sent the message, and to his surprise, a message returned that Doon would see him. That Doon would even come to him.

Herman fretted for hours, wondering now what it was he had wanted to see Doon for. There was no filial feeling, Herman decided. Family was nothing to him. It was the wish of a great player to meet the man who had defeated him, that's all. Napolean's wish, just before his death, to talk to Wellington. Hitler's mad craving to speak to Roosevelt. Julius's dying passion to converse, for just a moment as the blood poured from him, with Brutus.

What's in the mind of the man who destroyed you? That was the question that had nagged at Herman's mind for years, and he wondered, now, if he would find the answer. And yet this would be his only chance. Herman's five years of therapy had cost him dearly, and he could see—as so few others could—his mortality waiting around the corner. Somec only postponed, it did not end.

"Grandfather," said a gentle voice, and Herman woke abruptly. When had he fallen asleep? No matter. Before him stood the short, now rather portly man that he recognized as his grandson. It was shocking to see how young Doon was, though. Hardly older than when they had locked horns so many, many years ago.

"My legendary opponent," said Herman, extending his hand.

Doon took the offered fingers, but instead of gripping them, he spread the old man's hand on his. "Even somec takes it toll, doesn't it?" he asked, and the sadness in his eyes told Herman that, after all, someone else understood the death that somec so cleverly carried within its life-preserving promise.

"Why did you want to see me?" Doon asked.

And heavy, slow, inexplicable tears rolled out of Herman's aging eyes. "I don't know," he said. "I just wanted to know how you were doing."

"I'm doing well," Doon said. "My department has colonized dozens of worlds in the last few centuries. The enemy's on the run—we're going to outpopulate him if he doesn't do the

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same. The Empire's growing."

"I'm so glad. Glad the Empire's growing. Building an empire's such a lovely thing." Pointlessly he added, "I built an empire once."

"I know," Doon said. "I destroyed it."

"Oh yes, yes," Herman said. "That's why I wanted to see you."

Doon nodded and waited for the question.

"I wondered. I wanted to know—why you chose me. Why you decided to do it. I can't remember why, you know. My memory isn't all it was."

Doon smiled and held the old man's hand. "No one's memory is, grandfather. I chose you because you were the greatest. I chose you because you were the highest mountain I could climb."

"But why did you—why did you tear? Why didn't you build another empire, and rival me?" That was the question. Ah, yes, that's the question, Herman decided. It was so much more satisfying—though he still felt a small doubt. Hadn't he once had a conversation with Doon in which Doon answered him? Never. No.

Doon looked distant. "You don't know the answer?"

"Oh," Herman said, laughing, "I was once quite mad, you know, and thought you were out to wreck the Empire. They cured me."

Doon nodded, looking sad.

"But I'm quite better now, and I want to know. Just want to know."

"I tore—I attacked your empire, grandfather, because it was too beautiful to finish. If you had finished it, won the game, the game would have ended, and then what would have happened? It wouldn't have been remembered for very long. But now—it's remembered forever."

"Funny, isn't it," Herman said, losing the thread of the conversation before Doon finished speaking, "that the greatest builder and the greatest wrecker should both come from the same—should be grandfather and grandson. Funny, isn't it?"

"It's all in the family, isn't it?" Doon said with a smile.

"I'm proud of you, Doon," Herman said, and meant it for the time being. "I'm glad that if someone was strong enough to beat me, it was blood of my blood. Flesh of my—"

"Flesh," Doon interrupted. "So you're religious after all."

"I don't remember," Herman said. "Something happened to my memory, Abner Doon, and I'm not sure of everything. Was I religious? Or was it someone else?"

Doon's eyes filled with sorrow and he reached out to the old man sitting on a soft chair. Doon knelt and embraced him. "I'm so sorry," he said. "I didn't know what it would cost you. I truly didn't."

Herman only laughed. "Oh, I didn't have any bets out that waking. It didn't cost me a dime."

Doon only held him tighter and said, again, "I'm sorry, grandfather. Truly."

"Oh, well, I don't mind losing," Herman answered. "In the long run, it was only a game, wasn't it?" ■

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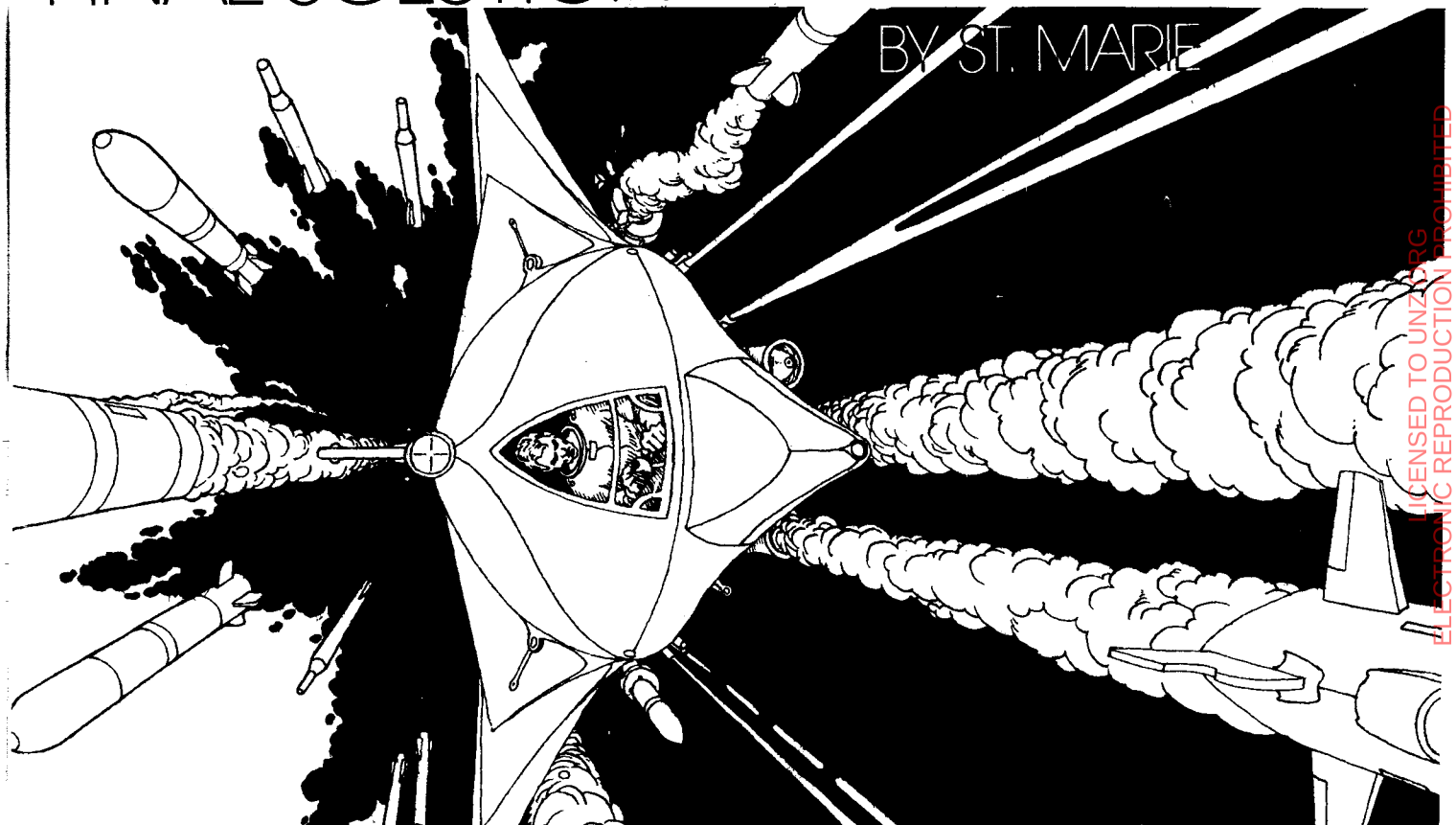
FINAL SOLUTION

BY ST. MARIE



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For every weapon there is a counterweapon—designed, developed, and wielded by a human being.

All the moments of his life that were worthy of memory had led to this.

He streaked through the upper atmosphere at a speed measured in kilometers-per-second. Coolly aloof, the panel gauge beneath the attitude indicator reported awesome temperatures building about the metal skin of his craft. The pale, green, cyclopean eye of the radar screen blinked in warning: the first wave of enemy defensive missiles was already rising to meet him.

No computer could have evaluated and reacted to the situation with his efficiency. He threw two switches, made a minuscule adjustment in a dial's setting. To the east and ahead of him, flocks of decoys took flight. Most—but not all—of the enemy barrage was drawn off.

His velocity reading's barely perceptible descent stalled. The temperature gauge needle reached ominously for the point where his craft would disintegrate into shattered jigsaw remnants flashing with futile glory through the night skies, a transient marker to the failure of his mission.

Programmed for self-preservation till sortie's end, a computer would have decelerated—precisely as projected by the architects of the enemy defenses. Their weaponry was primed for just such slower moving threats. A computer could not have responded as he did.

He touched the dial again, retracting still further the craft's prehensile wings. The temperature indicator shot into the danger zone. He was pushing the limits of design tolerance, but his ship was blasting a fiery trail through an ever-thickening atmosphere, flashing through the midst of the enemy missiles before their limited electronic brains could sort out the bewildering confusion of broadcast radar ghosts and decoys.

His heart swelled with triumph and gratitude—gratitude to the men who'd given him this chance. He was a convicted killer, an animal, and just years before he'd have been sentenced to death or worse: to rot away his span under life imprisonment, a continuing burden to the merciful society he'd affronted.

He readjusted the dial, opening the rudimentary wings toward full extension. The ship bucked and shuddered rebelliously as awful, conflicting strains tore at its component parts. The oxygen indicator was past the halfway mark; nine minutes' supply remained.

But great and good men had found a way even he could repay such a debt. They'd given him a chance to learn a vital role in defense of the society. He'd been taught and trained to guide twenty megatons of hell to its target.

The baleful, unwavering glare of

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the radar screen was splattered with dozens of fast-moving blips, their flight configurations indicating air-breathing interceptors. By a neural nanosecond he anticipated the hundreds of radar echoes flickering away from them as myriads of air-to-air missiles were launched to build an airborne carpet of destruction in his path. Only in number did the spots on his screen differ from countless simulator sessions.

So great and radical was their concept that a referendum had been required to bypass the filibuster blockade of bleeding hearts in the legislatures. Thousands decried the idea publicly; in the privacy of the very booth he was defending, they'd spoken louder. The Redemption Program was born to reality.

His speed had dropped to a multiple of sound. He opened a panel, flipped a toggle. Two long, slender rockets were simultaneously jettisoned to either side, falling momentarily behind his craft before their engines flared in a thirty-second burst blasting them ahead of him.

Of course, there was little in the plan for himself. But for his son—if he survived the vicious sneak attack—it meant pride, the right to hold his head high in the knowledge that his father had paid the debt, that the killer had evened the score and more by his defense of the society and the booth.

Forty seconds later, twin nuclear warheads detonated. The combined yield was barely a kiloton, but sufficient to blast a window through the deadly barrier. The fireballs completely deranged the heat-seeking guidance system of the few missiles surviving the blast effects.

Wise and compassionate men, devising a way even he could repay the debt of the heinous crime, cleansing the name his son would bear.

Even as he roared through the opening, the radar screen brightened with new blips. Eight triads of ground-launched missiles climbed toward him. This was something unmentioned in his training, something of which his teachers had known nothing . . . something for which no computer could have been programmed.

He'd never known his son; his wife had been pregnant at the time of his conviction. Somehow, just knowing he had a son had given his life a deeper meaning, had intensified the drive to clear his name.

He had no more nuclear-tipped rockets. The new missiles were too fast for his computer-sited twenty-millimeter guns.

They'd trained him well and thoroughly, even dignifying him by teaching him the history of events leading to the Redemption Program, events whose roots preceded his own birth.

He thought: all the enemy's known missiles were heatseekers. If these were the same . . .

In the fifties and early sixties, the people had borne the expense of

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manned bombers unprotesting. They were the only deterrent to ever-imminent attack by a treacherous enemy.

He slapped switches. The burned-out propulsion engines were blasted clear. His last decoys scattered away from his path.

In the late sixties, ICBMs were the primary strike force. Only the missiles had the speed necessary to pose a deterrent.

The enemy missiles swept past him, searching for the real target. Exhaling, he realized he'd held his breath. They'd been programmed to ignore decoys, vehicles whose primary heat source was at the nose—precisely his ship's infrared configuration with the engines gone and the still-glowing heat shield at the nose.

But in the seventies, the people had begun to begrudge the enormous cost of developing new weapons. The bulk of the money went for fabricating increasingly sophisticated countersystems to penetrate the enemy defensive net's ever more effective complexities. Their first reaction was to look back—to manned bombers. But they were so slow . . .

The navigation system showed him a scant eighty kilometers from his target: a great city, teeming with the enemy. All over that doomed metropolis, lights were winking on as if awakened by the chilling, ululating death song of the wailing alert sirens.

And manned bombers with the needed speed and countersystems were always obsolete by the time the first prototypes rolled down the test runways.

At sixty kilometers, radar showed the anticipated launch of antiquated—but still lethal—SAMs from silos and railroad cars encircling the city. He twisted the dial a final notch. Wing cups opened, foiling the air's rush. The ship completed its metamorphosis from sleek reentry bullet to incredibly swift, multimach glider.

The combination of ICBM speed and human guidance had been within technological reach since Shepherd's first tentative venture past the atmosphere's boundary. The problem wasn't piloting the vehicle to target; the problem was getting the pilot back.

He tugged the control stick, felt the lurch of hydraulics lifting the tail aileron. The ship swung into a climb, trading velocity for altitude.

Solutions to that problem were even more expensive. What was needed were men willing to throw away their lives to insure a warhead's delivery to target. But what kind of man would that be? There were volunteers—but their very location at the periphery of patriotism underscored their instability.

At forty kilometers, he peaked his climb, wheeling the ship over into a steep dive that bartered back altitude for speed. Outrun, outranged, the SAMs dropped off—except for two. On these rode the hopes and prayers of a godless enemy's city.

The answer all but presented itself.

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He flattened the dive at seven thousand meters, but the nearest SAM's interception course was obvious. With a cold knot in his gut he realized that the earlier deviation from plan—maintaining speed when deceleration was scheduled—had caught up with him. The computer-sited cannon were devastatingly accurate—at speeds under Mach 1.8. At greater speeds, they were useless. His speed was Mach 2.3.

By the end of the decade, the prisons were bursting with men sentenced to death or life imprisonment. Commutations and endless appeals had all but equated the two. There were thousands in cattle pen jails with horizons foreshortened by iron bars. The increasingly frequent, widespread, bloody rioting was no less evitable than death following suffocation.

He gambled. Manually overriding the computer, he eyeballed the siting grid that winked on across the screen. He jabbed the firing control viciously and held it. The twin mouths of his twenty millimeter cannon vomited murderous slag from the front of his ship, filling the airspace ahead of the SAM. The radar screen suddenly brightened with an expanding sphere of debris, but his elation quickly died. The last SAM was boring implacably toward him and the EMPTY *light winked crimson failure at him from over the ammunition gauge.*

And then, too, there was the cost of maintaining these men.

Crude though its homing system was, the last SAM had him. His counterweapons were depleted. He was too near his target to attempt lateral evasive maneuvers.

The solution became obvious. Shockingly, there was an early deluge of applications from men willing to chance that they'd have to fulfill their mission in exchange for a paltry few privileges while waiting out their years. But the first tests were so successful that all the nation's missiles—offensive and defensive—were modified for the matchless guidance system of the human mind. The prisons were emptied of the doomed and still, more missiles waited.

A last chance: simultaneously, his left hand triggered a tank-emptying four second retrofire while his right detonated the explosive bolts and jettisoned the now-extraneous heat shield.

He remembered his first morning's awakening in the place of his education. All was clean and crisp and pure after the drab olive greens and khakis of the prison. The spotless white of the uniform, the sterile white of walls and ceilings, the unaccusing white of his room—all eased and gentled his soul.

The combined forces braked his speed abruptly. His altitude fell off sharply.

He remembered the drugs designed to accelerate his learning ability, the injections like a metronome beat through his life, an unwavering cadence giving pace and rhythm to his existence.

The SAM couldn't compensate in time. It shot upward through the

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point where its stupid brain said he should have been. It couldn't possibly correct in time, not now.

With loathing, he remembered moments of unease when he seemed to recall signing the Redemption Program papers after the injections began. The thought had set off an alarm deep within him. He'd blurted the vague misgivings. Patiently, endlessly, his teachers had repeated the simple explanation: one of the learning drugs' unfortunate side effects was a time sense distortion. Eventually, he accepted that his memory had been playing cruel deceits upon him.

The city lay supine before him. He set the detonator for two kilometer's altitude and swung into his final approach.

He'd begged for a picture of the wife whose face had faded from memory. They'd relented, rewarding him for training progress. But even then, hers was a stranger's face arousing no latent memories of happier times together nor of his wedding. Surely, he'd thought, the vow-taking was something that should have survived the drugs. Deeply shamed by his doubts and failings, he'd never spoken of the lapse to his teachers; the omission only deepened his sense of guilt/inferiority/obligation. It was, he'd told himself, another of the unfortunate side effects of the drugs. He'd consoled himself with the same thought when it began to seem that his son's growth—evidenced by photographs periodically shown him—was too rapid.

His passage shattered the peaceful skies, the slumbering darkness torn and howling with agony as he ripped through the guileless shroud of child-innocent night toward his appointment with honor two kilometers above the prone city's heart.

And then there'd been other times, times more awful and fearful, times when all he knew of his crime were the vivid eyewitness accounts of unseen citizens in a courtroom curiously identical to those he remembered from television dramas seen in boyhood days, times most hideous when he could recall nothing of capture or the faces of the jurors or judge—though he would never forget the godlike, mechanical voice pronouncng his sentence with such damning finality. Those were the times when his memory shimmered with elusive phantom visions of a stark room, calling forth the distant prickle of one arm near the shoulder—

The air-supply indicator showed two minutes. The altimeter plunged through twenty-four hundred meters. He was seconds from the debt-paying two kilometer mark, seconds from Redemption.

—without transition, the memory cascade of the voice that pronounced his guilt, dingy prison walls, appeals that never went through and then the abrupt shift to—

—the spotless white of uniforms, the sterile white of walls and ceilings, the unaccusing white of—

The altimeter touched Redemption. ■

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Consumer Action
Box 1984
New York, NY

Analog Science Fiction/Science Fact
350 Madison Avenue
New York, NY 10017

Gentlemen:

This is a letter of warning to all people who saw the advertisement for Black Hole Disposal Units in your September issue: Avoid buying or inform us immediately if you have purchased that item so that it can be properly disposed of.

Legal action is now being taken against the company Nothingness Unlimited for consumer fraud and the selling of hazardous products. Subatomic-sized black holes, though they are efficient in disposal of garbage, are not maintenance-free and thoroughly safe as was advertised. Black holes of such a small size, in fact, radiate tremendous quantities of heat, and will thermally run away and explode in a gamma pulse if left unattended. A very dangerous item for the consumer, and it, of course, does not live up to its infinite warranty. Further, anything disposed of accidentally cannot be recovered. Several families have already lost their pets and valuables such as rings down these units. And that black holes are available in seven decorator colors is pure outright fraud, though impossible for the ordinary buyer to disprove. In fact, we are lobbying for the complete elimination of commercial black holes below a certain mass limit to prevent unscrupulous companies like Nothingness Unlimited from taking advantage of the poor consumer in the future.

We are, however, having difficulty locating company officials who are to stand trial. It seems that they, their office furniture, and records have disappeared without a trace. All we have is rumors that the company liquidated itself into one of its own black holes. Any information leading to their possible whereabouts will be greatly appreciated.

Objectively yours,

J.M. Klein
Consumer Action

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THE WANDA LAKE NUMBER

"Show business" was originally a religious experience.

ROBERT THURSTON

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Bodaken looked out the small square dressing room window and tried to see the neon sign of the Pink Lobster, the town's only other night club. Except for an occasional red or yellow flash from approximately the right direction, the torrential rain obscured everything on the other side of the street. This kind of storm might have shorted the Pink Lobster's sign. The TV weatherman had said many lines were down already. If the storm continued any longer—and it threatened to do so—a state of emergency might be declared. Just my luck, Bodaken thought, to be stranded in this seedy night club in this seedy town, looking over a reportedly second-rate act and trying to land it for Jed Strang and his third-rate agency. Any day now Jed Strang is going to call me a dumb sonofabitch for the ten thousandth time, and I'm gonna tell him I'm pack-

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ing it in and where he can get off and why do I even think about it, Strang'll fire me before I ever resign.

He turned away from the window and directed his attention toward his mission objective, Jackie Zimm, who was working on his absurd looking machinery in a dressing room corner. Zimm seemed more comfortable in corners or behind machines. Definitely not your average outgoing showbiz personality. Bodaken, who preferred to deal with extrovertish entertainers, had disliked Zimm at first sight.

"It's heavier'n' ever," Bodaken said, gesturing toward the window.

"Terrific," Zimm said without looking away from his machinery. "Goddamn lousy karma, that's always been my hangup." He made a minor adjustment to a minor switch. "Bad for you."

"Why bad for me?"

"You won't see me in all my glory. Making the audience swoon, making the walls quiver from simultaneous intakes of breath."

"I can judge if—"

"Jesus Christ, don't. I can't stomach showbiz hype. Your lousy agency ain't gonna take me on, any more than any of the good ones ever did."

Bodaken wanted to tell him that he'd be happy to turn him down, but that of course would not be kosher. Zimm was right about the hype, Bodaken could not exist without it.

"Our reports say you're the best at what you do," Bodaken said.

"They're right."

"Then there's every chance we'll take you on."

"Ah, who cares? It'll be a lousy night, everything'll be off. You'll fly back to the Big Apple and I'll go on playing tank towns."

Bodaken was not used to a performer who would not hustle him. This man was in bad need of an agent, that was certain.

"Goddamn room'll be empty tonight," Zimm muttered. "I'm getting superstitious. Rain follows me to every dumb town. Well, the dumb chick'll be here anyway. The retard."

"Retard."

"I don't think she's actually retarded, just dumb as hell. Sits there like a zombie during most of the show. Looks like a circus freak, except that she's not missing any parts. Not any I can see, anyhow. Ah, she should—"

"You make me shudder. I hope you don't use that cruel streak in your act."

"Don't suggest it. Tonight I just might."

He continued to tinker. To Bodaken the machinery just looked like a bunch of dials and levers, nuts and bolts. It didn't even look much like a minicomputer, which it in part was. The few people, like Jackie Zimm, who were qualified to operate it didn't give away secrets on its workings. Jackie Zimm especially, since it seemed he could not carry on a pleasant conversation if a guaranteed two weeks in Vegas depended on it. And, if he chose, Bodaken could guarantee two weeks easily.

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"That chick gives me the willies," Zimm said suddenly. "All the time at the same table. If she can get it. Half the time, *most* of the time she ignores my act. I could do the chariot race from *Ben-Hur* and she'd stare in that zombie way. I mean, I'd rather play to a totally empty room. The only time she wakes up is when I do Wanda Lake. Then she crunches down on her chair, practically rests her head on the tabletop, and her eyes start to glow like somebody's put bulbs in them. For Wanda Lake she is the best audience ever. I hate doing Wanda Lake."

"Why's that?"

Zimm shrugged.

"I don't know, not sure. Wanda Lake was one of my first, when I was just mastering the technology of this godforsaken device. I worked on that impression day and night, figured out the proper moves, programmed the right vocal tones, got that extra edge of sexiness which no human impersonator had ever been able to duplicate. I mean, I studied all the extant films and tapes—video tapes there were damn few of, sound tapes galore but hardly any videos. You can imagine what a handicap that is in my line. Still, I got her down completely. It was a great success at first, the Wanda Lake number. Did it on TV, only time I ever made network on the tube, got lots of calls. But, I don't know why, I grew to hate it."

"I've heard about the Wanda Lake, been looking forward to—"

"I'm gonna do it for you, don't worry. I just hate it. Don't know why, it just got away from me maybe. Impressions are like that. They take you over, you become them, you lose pieces of your own personality, become afraid that one day there'll be nothing of yourself left. That's the way it works out, you just have to do less of certain performers, more of the others who don't affect you in the same way. Most don't affect me. But Wanda Lake, Wanda Lake affects me. I hate it, yet I always feel I got to do it. Every night I feel—ah, maybe it's the chick forcing me to."

"Did she request it?"

"I never the hell noticed her. I'd been doing Wanda for two or three shows before I began to feel her eyes just creeping up my back. You sometimes feel things like that from an audience. When I saw her for the first time I had a hard time keeping my eyes off her. That black hair and soulful face, you know. I asked Nadle, he said she'd been there for every show."

"Maybe she won't make it through the rain."

"Ah, she'll make it all right. Damn, wish I could cancel out the rest of the week. Takes a lot of energy, psychic as well as physical, to do my kind of act. Trouble is, when I get out there and spot that chick now, I feel I *got* to impress her. She's like a challenge. Like getting a zombie to react, you know?"

He returned to his machinery, tinkered for a moment, then stopped for an afterthought:

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"Next time I hope I can get booked into a hotel gig. Your agency takes me on, you get me hotels, all right? In a hotel you can depend on a captive audience, no matter what kind of freak storm springs up."

"I wondered about that, why you're not doing the top rooms? Everybody says you have the best control over—"

"That's a subject I don't wish to dwell on."

"Sorry."

"No, all right, me that should be sorry. Look, Bodaken, I shouldn't tell you this, give you such solid reasons for turning me down—but, look, man, I'm afraid, been afraid all my dumb life. Grew up afraid. My mother has enough personalities they could write a best-seller about her. Only trouble, she's got only one personality for doctors and cops, so nobody outside the old family unit suspects her condition. My father, father's a creep who picks up garbage for a living and I always thought as how he brought home his work with him. My, uh, siblings hid in closets and dresser drawers just to freak out and scare me. The streets, I'm so afraid still I can't tell you about the streets. Ah, the hell with it. From the looks of you, you got a more painful story to tell than me, Bodaken."

Bodaken knew exactly what Zimm meant. Every morning he looked in a mirror, he saw the pain lines of his face. But he could never admit this pain to someone like Zimm, so he said:

"No. Surprisingly I'm quite content, I have quite a comfortable life. My family, my kids, my job, they all—"

"I see, I see. You're a liar. Or at least not a complainer like me. Hell, showbiz is a haven for complainers. We all do songs and jokes as a way of attack, a way of showing how much we hate the rest of you."

"That's, well, it's a rather odd philosophy of show business."

"Show biz has no philosophy. It sucks, therefore it am. How's the storm?"

Bodaken glanced out the window.

"Don't ask," he said.

"Maybe there'll be a flood. I'd like that."

"Jackie Zimm your real name?"

Zimm laughed.

"No. Who needs a real name when you can be anybody? My proper label is Gerald Zimroth. I'm just Jackie Zimm to those who love me. Look, man, I got to get this adjustment just right, matter of fine tuning and all. Excuse me, okay?"

"Oh, sure. I'll go out and count the house."

"Good, you can use the numbers you learned from *Sesame Street*."

Bodaken left the room without responding. His walk was weary, his shoulders slumped, as if he expected the ceiling to cave in at any minute.

The Ginjer Snappe Room, where Zimm would be doing his act in less than an hour, was quite uninhabited. The room lacked definition for Bodaken, it did not have the character of other showplaces he'd been in. He saw

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it as an ill-lit room whose borders and corners were so plunged in shadow that he sometimes felt there were no walls, no ceiling, no alcoves, just gateways into other dimensions. He walked through it, past the bar, past the row of pinball machines, and to the club's entrance where he found the waiter Nadle, a towel over his arm (more insignia than instrument), looking out the glass doors at the storm.

"Gets worse instead of better," Nadle said.

"What kind of storm would be better?"

"Your jokes are as bad as Zimm's."

"You're so worldly, Nadle."

"You bet. He should get somebody to write material for him, he wouldn't have to work a dump like this."

"I gather then you approve of his technique."

"Gather, what's that, gather? He's good, tell you that. He's tuned into the machine, it's part of him. Sure he's good, best picmimic in the business."

"Then you got something, he shouldn't be working a dump. Why not Caesar's Palace, the Sands, any place bigtime?"

"Who knows? Maybe it's him. Maybe nobody can stand him. I can't."

"So what? You only see Zimm at the end of the act."

"Don't need to see him. He's always there. In the projections, know what I mean?"

"Well, I'll acknowledge that he is modulating the individual impressions and so in a way it could be said—"

"Could be said, yeah, could be said. Modulating. Listen, no matter what kinda clothes he puts on, he's still Zimm. Same for the projections. They're just his costumes."

"My experience has been that impressionists don't usually exhibit that much of their own personality in their acts."

"Don't they? You say. May be so."

Nadle turned back to the window.

"All we need, a flood. Keeps up, we'll have one. Just our luck, we had this place remodeled last month."

"I didn't realize, couldn't tell."

"Don't get nasty. Nobody comes, maybe I can close up. Crazy. I don't know why anybody'd want to come here anyway just to see a bunch of old-time impressions."

"You may have something there, Nadle. This's definitely not a nostalgic age."

"Yeah, you got to have a hard edge to an act nowadays. Look what's happening mainline. Look who's making it in the big places. You got a better chance of making a million, you beat up your wife onstage."

"So long as you do it twice a night."

"Yeah. Wish I was married. I'd do that act."

"I'm married."

"Would you do that act?"

"On certain days."

"Certain days, yeah—"

Nadle's comment was interrupted

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by the ringing of the housephone. He answered it, muttered, handed it to Bodaken, said, "Strang." This was the third time Strang had called today. It turned out to be the longest call yet. Strang called him a dumb sonofabitch eight or nine times, a few more tallies on the way to ten thousand. Bodaken nodded, while his boss told him to get the job over, fly out, don't waste time if Zimm's a no-talent, trust your own judgment but you better be right you dumb sonofabitch, and other pleasantries. Bodaken could tell that Strang thought Zimm might be a troublemaker, and Strang didn't like troublemakers. Unless, of course, they were worth a cool million, and Zimm might be. When Bodaken got off the phone, he rubbed his ear to see if it had swollen under Strang's attack.

Nadle was no longer by the door. Bodaken pulled the lever on a pinball machine, was astonished to find a ball in the shooting lane. It slowly went around the upper curve and drifted through the center entrance to the main field of play. He watched as it hit several of the lighted globes and bounced off rubber bumpers, knocked down a couple of targets. He was so amazed by its existence that he did not think to locate the flipper buttons and use the ball for its full play. It bounced off one of the bottom flippers and arched around it into the final hole. The board clicked and recorded a large number of points.

Bodaken turned away from the pinball machine and was startled by Nadle standing close behind him.

"Thought that machine was broken," he said.

"Guess it isn't."

"Guess so. We got an audience now. Our usual lonely customer."

"Zimm calls her the chick."

"She looks molting right now. Came here through the rain without even a coat. Jesus, I can't stand to look at her."

"She's not attractive?"

"She's not a bad looker, I just can't stand to look at her right now. All that wet hair all over her face. Her dress sticking to her. I got to get her drink. Drink! She'll nurse one glass of ginger ale through the performance. Nurse, hell. She'll hardly touch it. Yet she's got to have Canada Dry, can you figure it?"

Bodaken walked to the door of the Ginjer Snappe Room. In the dark he could not make out any recognizable shapes.

"Can't see her," he said to Nadle.

"Who ever can? She's there, the phantom. Maybe she's not there. Maybe she's one of Zimm's projections. So he can have an audience. Pardon me, I've got to select the proper vintage of Canada Dry."

As Nadle walked away, Bodaken noticed how stiffly he kept his arm, as if the towel draped over it had to remain parallel to the floor.

The girl looked as if she had collapsed and died right that minute. A cigarette still burned in her right hand, ready to drop out of fingers that seemed lifeless. Her head, eyes closed,

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lay against the upholstered back of the chair. A wet spot was forming in the red upholstery. Her left hand hung straight down without moving.

She might be pretty. The black hair was certainly striking, even in its bedraggled condition. Her nose had a pleasant slope, the mouth a pleasant line. Complexion was too white, of course, pasty, but that was to be expected in someone who haunted a nightclub room. Her body, whose outline was shown quite clearly in the wet clinging pattern dress, was not bad. A bit too much hip and thigh but otherwise slim. Given a chance, he would sleep with her, if she had a taste for agent's representatives who were overweight and gone to seed.

Her eyes opened suddenly. The blue of them was vivid in her white face. She looked right at him, but she did not see him. He could back away, and she would never know he had been there. Instead, he spoke:

"May I join you?"

"Did I miss the show? The early show? They wouldn't've let me sleep through it, would—"

"No, matter of fact, show's about to start. That's why I thought I might join you. Unless there's a late rush, we are the entire audience. May I sit? Here?"

With her cigarette hand she gestured toward a chair. It was difficult to tell whether the gesture meant sit down there or go away creep. He sat in the chair quickly, before he could find out that she meant otherwise. She stared at the stage, seemed unaware that he had joined her. He was fascinated by the cigarette hand. Once it settled again, she showed no intention of smoking the cigarette. Would she let it burn down to her fingers? She had awakened in fear that she had slept a long time when the burning cigarette should have clearly told her that she had not. It was quite likely that she had forgotten it, that it would burn down to her skin before she

In times to come

In our February issue we will publish the last of the planet Medea stories that will appear in Analog. It is "Songs of a Sentient Flute," by Frank Herbert, and gives us yet another view of this group-created place and its inhabitants. Dean Ellis has done a stunning cover illustration for Herbert's novelette.

Also in February we'll have a fact article on artificial intelligence. This is a very serious piece by Hans Moravec. And we'll have a not-so-serious piece on computers that write (!) by Paul Nahin.

Part two of John Varley's novel, TITAN, will be in this issue, along with as many short stories as we can fit, and all our regular features.

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became aware of it again. Perhaps even then she would not become aware of it. Should he politely mention the cigarette? Refer to it obliquely by asking her for a light? Take it from her? He might have to spend too much time explaining the question and the cigarette might burn her anyway.

His inner debate reached a conclusion, if not a resolution, when her hand traveled slowly to an ashtray and she stubbed out the cigarette. She had not looked at it once.

"You, uh, you must be quite a fan of Jackie Zimm, miss."

"Who?" she said after a long silence, and he had to struggle to remember what he had said.

"Jackie Zimm. This act. You watch it regularly. He is responsible for the projection-impressions. The picmimickry."

Another long pause, though she did nod a couple of times.

"Oh. That. I didn't know his name."

"You must—well, maybe not. Would you like something to drink?"

"Ginger ale, please, no ice. Canada Dry."

Her response this time was immediate, ritualistic. Nadle was already approaching the table, carrying the small bottle and uniced glass. He set it down in front of the girl, poured some ginger ale into the glass, and glanced at Bodaken as if to question his presence at the table. Bodaken shrugged, an indefinite but apparently adequate reply. Nadle nodded before leaving.

"My name is Bodaken, miss."

He wished she would at least look at him during her long intervals before answering.

"Pleased," she finally said, no pleasure in her voice.

His turn to pause.

"And yours?"

"My what?"

"Your name?"

"Marcia."

Some annoyance would at least have given him a message.

"Would you prefer I sat elsewhere, Marcia?"

He had hoped that the direct approach might shake her trancelike state, but it did not.

"Whatever," she said.

"It's about time for the show. Perhaps we'll talk again."

Mention of the show provoked her to shift slightly in her chair.

"Perhaps," she said.

"So long."

She offered no farewell. Bodaken took up a position to her right, near enough to study her and watch Zimm's act simultaneously.

A sharp click came over the loudspeaker system, followed shortly by the music recording that preceded Zimm's act. Since Zimm required no musicians and there were no other acts on the bill, no orchestra had been booked for the week. In the old days the musicians' union might have made a fuss, but nowadays it was controlled by people too anxious to keep their own jobs to make much of a fuss about

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their out-of-work colleagues. These days nightlife meant hustling for dimes, there were only a few good gigs available, and they were usually one-nighters to play c-w Americana for the current batch of city aristocrats.

Bodaken noticed a rustle in the backstage curtains next to the booth from which Zimm watched and monitored his impressions through a one-way glass. The rustle probably indicated some last minute adjustment to the projection equipment. The record came to its end after skipping a large part of the music with an ugly scratch sound. There was a moment of quiet as a spotlight slowly searched the stage and magically discovered Zimm's opening projection.

In a pose of patient waiting, Zimm's Jack Benny projection held its hands prissily together and looked off to the side as if expecting a reaction. Bodaken could remember seeing Benny on TV when he was a child. In the interim he had seen a few of the comedian's old films and tapes, all of which gave him a pretty good idea of the man's talents and mannerisms. Zimm's projection-impression of Benny was astonishing. Zimm operated his controls superbly to catch so well the stance, the look, the gestures. Listening to the precisely correct Benny tones and inflections in this projection, Bodaken found it hard to imagine that Zimm was whispering the words into a backstage mike in his flat New Yorkese.

As he watched the figure of Benny walk about the stage and do a typical routine, Bodaken was amazed at Zimm's use of the projection-impression technique and at Zimm's abilities as a picmimic. Critics of the process often complained of its fakery. They were forever fond of pointing out that there were sufficient visual and sound records extant of the performers. One could go to them instead of a phony act that pretended they existed again in the form of holographic projections manipulated by a skillful technician. It was not art, they said, it was not even show business.

Watching Zimm's impression of Benny, Bodaken felt anything but cynical. No tape or film, no sound recording, could capture the thrilling illusion of seeing the performer in three dimensions, moving around a stage, chatting with an audience. Further, the performance could be brought up to date, as Zimm was doing now by having his Benny projection make jokes about the storm outside. This projection, if anything, appeared more alive than anything from an archive. Perhaps that was why most picmimics chose to re-create dead performers.

Zimm started off his Benny projection in a talk show chatty mood, his bemused eyes staring out from behind thick lensed eyeglasses. Then he gradually removed age from the figure, transformed it into the young TV series image, the victim of circumstances and his own absurdities. Then, younger still, the miser from radio. He finished with the movie version, the fortyish semihustler whose ill-con-

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ceived plots backfired. Bodaken especially enjoyed this manipulation of the performer's age. What other form of mimickry could achieve that?

Bodaken sat entranced as Zimm proceeded from impression to impression. Each one was skilled, magnificently detailed, yet Bodaken had the feeling that Zimm was rushing, not spending much time with each individual segment, putting in mannerisms that were not quite right, doing lines that were unsuitable to the performer. When he had Al Jolson in blackface mutter something about doing a little number for all my fellow niggers out there, Bodaken knew something was wrong.

Suddenly he realized that Nadle, holding the ever present towel at the precise angle, was now standing beside him.

"What's he up to?" Bodaken whispered.

"Who knows? Maybe this's what I heard about."

"What?"

"Zimm flips out, I was told that. Abuses his re-creations."

"Never heard about it."

Bodaken returned his attention to the stage. The act seemed routine again. Still, each performer that Zimm re-created watched Marcia out of the corner of an eye. Bodaken began to feel tense.

For a moment the stage darkened, then a spotlight came up and the Wanda Lake figure stood lethargically, a microphone dangling from her hand, looking as if she might drop it at any second. That was the way the real Wanda Lake had always started her night club act, with a carefully cultivated indifference to the audience. Bodaken had seen her act several times during her brief career, and that opening had never failed to excite him—or, for that matter, most of the audience. Press releases at the time said she was a psychic and could not begin to sing until she felt the desire for it emanating from her audience. Every time Bodaken saw her that emanation came quickly. Then she would lift the mike to her face in a slow sexy movement and begin one of her soft ballads. As the audience's excitement grew, she would switch to upbeat tunes. Usually her penultimate song was a jazz/rock piece that, in a way, molded her and her audience, who joined in on the last choruses, into a unit. She would then finish off with a sad ballad, generally the same one, "My Worries Are Over," a song that presented a rather complex picture of stoicism.

Wanda Lake had had a fine voice but a strong part of her success was her onstage appearance. Her casually combed red hair and nearly black eyes dominated a lovely face. She was a little gaunt, but the way she moved her body during an upbeat song, that did not matter.

Much of the present day fascination with Wanda Lake derived from the mystery of her career, which ended as abruptly as it had begun. She was a rarely seen performer. She appeared on TV only a few times, and never quite to the explosive effect she had in

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a concert or night club performance. There was no announcement of her retirement. People just gradually realized that she no longer performed. The usual rumors spread—that she had been killed, that she'd committed suicide, that she had been paid off and forced into retirement because of a scandal, that she had contracted a debilitating disease, that she had gone mad. Gossip magazines explored all the possibilities. A few years later her death was announced without explanation. Bodaken had heard that the last anybody had seen of her, Wanda Lake was a fat blob of a woman confined to a rest home bed.

Zimm's projection of Wanda Lake stood in tableau for a long time. Which made sense, since there was virtually no audience to receive emanations from. Bodaken looked over at Marcia, who was now leaning forward. She seemed apprehensive, as if she was afraid that the act would not begin, that Wanda Lake would decide there wasn't enough love in the room and stalk off the stage. Marcia seemed to be striving to send out enough love to cover for the absent audience. The animation in her normally inexpressive face surprised Bodaken.

Zimm finally started the Wanda Lake number. He had the raising of the microphone perfectly timed. He started the song with just the right touch of sultriness. Marcia looked almost happy. Zimm brought the first song to a finish, then went into an upbeat tune. Bodaken felt sure that he had heard Wanda Lake sing the song just like this twenty years ago. No recording of any kind could recapture the *feel* of such a superb in-person performance.

Marcia sat up straighter. She looked like a child to whom extra presents were being given at a rate too fast to open them. The ending of the upbeat song was a smash and Bodaken clapped loudly, without any embarrassment that his was the only applause. Marcia's eyes were bright with joy. The glow from them almost competed with the fire in the eyes of the Wanda Lake projection.

Bodaken expected Zimm to go into another number, perhaps finish off the segment with the "My Worries Are Over" trademark number. Instead, the projection relaxed and started to roll the handmike contemplatively against the front of her chin.

"Darlings," the Wanda Lake said. "Darlings, I'd like to take time to reflect for a moment on the absolutely nonsensical side of this profession. Anybody want to hear?"

The figure seemed to look around the room as if it were filled to capacity. Bodaken did not remember the original Wanda Lake saying much between songs, just patter. He could not even tell if Zimm's impression of her speaking voice was accurate.

"I want to hear," whispered Marcia. The whisper startled Bodaken.

"Well, I want to tell you. I want to tell you about rooms where cockroaches sit in judgment and, man, if they don't dig your hustle, your act, watch out. I want to tell you about the

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smell of powder, the feel of powder. Any dressing room in these here United States, it's there, you breathe it right away you walk in the door, it's thick on your skin before you've applied it. I want to tell you about waiters who have more *chutzpah* than they got brains—"

Bodaken, out of the corner of his eye, saw Nadle's towel arm drop.

"I want to tell you about seedy agents who slip contempt in at the bottom of their vocal register."

Bodaken smiled, not caring the attack was on him.

"But, man, I want to tell you about a business where to be compulsive is the index of rational behavior. You didn't think I could do phrases like that, did you? Well, I got numbers that . . ."

Her voice trailed away and for a moment it looked as if she was not going to say any more. Bodaken glanced at Marcia, was surprised to see that she had now stood up and come partway around the table. He took a few steps toward her, ready to restrain her if she made a rush toward the stage. The Wanda Lake projection abruptly started speaking again:

"I want to tell you about the people who hold the reins, crack the whips, run tractors around your soul. I want to tell you about songs they say I can't sing because they might offend America's heartland. About businessmen—about leeches—who see your tits as dollar signs, your ass as long-term investment dividends. About politicians who ain't interested in your politics so long as you swing it to the right, then swing it to the left. I want to tell you about audiences so like robots they respond only to cues, only to nuances that have been previously explained, that applaud only to soothe you and not because they are inherently happy or somehow elated from your performance—because they get more value out of you if they play according to the gratification system. Value, not some kind of—kind of what?—appreciation they feel inside? A genuine sense of entertainment? God forbid, a conviction that art had been present? Anybody want to hear?"

There was a terrible silence as the Wanda Lake figure scanned the empty room, stared at particular empty chairs. Marcia took another step toward the stage. Bodaken, without touching her, reached out a hand.

"Anybody want to hear?"

"I do!" Marcia shouted. The projection whirled around. For a moment it looked more like Jackie Zimm than Wanda Lake. The anger, at least, seemed like his.

"I do!" Marcia shouted again. Bodaken grabbed her before she could run onto the stage. "Oh, Jesus God, momma, I do. I do, momma."

The Wanda Lake looked shocked. Then there was a series of loud clicks backstage, behind the one-way glass, and the projection disappeared.

Bodaken stood in the dressing room doorway, one foot still in the corridor, the other just inside the room, for a long time. He watched Zimm work

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with his machinery. The entertainer's manipulation of his tools seemed more energetic now, less the tinkering it had been earlier. Zimm cursed and leaned back. Looking up, he noticed Bodaken in the doorway.

"You buying?" he said noncommittally.

"Buying you?"

"Of course me. What am I selling, my good looks?"

"I don't know. I think we might sit down together if the terms look right."

"Any terms're right. I accept. You don't like that."

"No, frankly, I don't."

"Well, commit or not. I don't care. Just let me know. You want me, just put a contract under my nose and give me a pen."

Zimm looked strange. At first Bodaken could not tell why. Then he realized that the man's hands were still. He had never seen them not working.

"Something happen out there?" Bodaken asked, walking a couple of steps into the room. Wanda Lake was right about the smell of powder in a dressing room, he thought. Wanda Lake was right? What was he thinking? Zimm was right.

"Something like what?"

"Some of your act seemed a little off. In small ways."

"That's not what you meant. Yeah, it was off. Sometimes it goes off like that, something in the system doesn't cooperate and a movement isn't right, a vocal thing too high or low. Why do you think I'm all the time fixing this stuff?"

"Didn't seem like the system."

"Okay, it was the operator then. Get off my back, Bodaken. Make your deal or get out."

"Sorry, didn't mean to trouble you."

"Troubles like you, I don't need troubles."

Although his body remained still, Zimm's head shook just noticeably, as if he were holding in anger.

"What happened to the Wanda Lake number?" Bodaken said.

"Went off a bit, like the rest of the act and that's what happened to the Wanda Lake number, end of story."

"Is that girl Wanda Lake's daughter?"

Zimm's hands finally moved. They bobbed up together, splashing the air like water.

"Why ask me? Try asking her."

"I did."

"Yeah? What'd she say?"

"Nothing. I asked her if Wanda Lake was her momma and she didn't reply. She's back to being a zombie. All she said was ginger ale, Canada Dry."

"Well, man, I wish I could turn her off, like one of my projections."

Zimm's left hand fiddled with a dial. Casually, as if searching for a radio station.

"Okay look," Zimm said, "I did a bunch of research on Wanda Lake. I do mucho research on everybody I do. About Wanda Lake I know everything there is to know, and there's nothing

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there about a daughter. Okay look, I don't have any clues to husbands, lovers, anything."

There was a clap of thunder outside. The rain seemed to have let up somewhat.

"Jackie," Bodaken said, "if I'm off base in asking what I'm going to, just say so. I know something about psychic phenomena and what happened out there tonight looked like possession."

"Possession?"

"Well, what I wondered is if maybe something like the spirit of Wanda Lake had possessed you. I mean, that monologue was definitely odd—"

"Stop it, Bodaken, that's enough. I was not possessed. I was in complete command of my faculties such as they are. I am possessed only in the sense that I am Wanda Lake when I'm doing her in the act. I'm all of the people I do, but only for the duration of the act. I'm a technician, a craftsman. Technicians are not vulnerable to possession by spirits. Okay?"

"Sure. I believe you. You were in command of your faculties."

"Somehow when you say it, it comes out against me."

"I didn't mean anything."

"Why don't you go judge somebody else's floppo act?"

"Matter of fact, I'll have to be doing that."

"Do it then."

"All right."

"Excuse me, gentlemen." Nadle stood in the doorway. His towel was slung carelessly over his shoulder.

"What is it, Needle?" Zimm said.

The waiter ignored the mispronunciation.

"We have to close up. No second show tonight. Sheriff called, says all the businesses'll be shut down for the night."

Zimm seemed relieved.

"Okay look," he said, "I'll stay here. I got work and there's a cot and food."

"All right with me," Nadle said. "I don't own the joint."

Zimm returned to his machinery as Bodaken followed Nadle out. In the bar he picked up the house phone to call Strang, but was greeted by a noisy silence inside the receiver.

"Phone's out too," Nadle said. "Forgot to tell you."

"Where's the nearest phone?"

"Outdoor phone on the corner. Might work."

Although the rain had diminished, the wind had picked up in velocity. As Bodaken approached the kiosk, he noticed that it seemed to wobble on its foundation. No matter, he had to get the call to Strang over with, and would risk death to do so. The rain beat noisily against the glass sides of the kiosk as Bodaken, discovering that the phone did work, had the call put through. Strang answered in his usual way, without hellos, just plunging into conversation. He told Bodaken not to hedge, tell him about the act. Bodaken said he recommended Zimm qualifiedly. Strang went into one of his rages, said he was hedging, screamed that only a dumb sonofa-

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bitch working for him would put qualifications on his recommendation. Bodaken tried to explain that Zimm was difficult to get along with and might make too many waves if they signed him on. Strang said only a dumb sonofabitch would make that objection, especially if the property represented big profits. The kiosk swayed in the heavy wind and Bodaken thought for a moment that it was about to fall over, but it righted itself. Strang asked if he was still there and called him a dumb sonofabitch again. Bodaken decided that was the ten thousandth time, and told Strang he was quitting. Strang said he could quit if he wanted to but be back in the office on Tuesday. Bodaken said Strang didn't understand, he really meant it, he was really quitting. Strang said sure and hung up abruptly. Bodaken tried to explain again, this time to the telephone, that he really meant it. The telephone seemed about to contradict him, then to think better of it.

Bodaken made his way back to the club through sheets of rain. He hoped to catch Nadle before he left, especially since he'd just realized he'd forgotten where his hotel was located. The door to the club was unlocked. He bypassed the main areas and went directly to Zimm's dressing room. Zimm was not there, nor was his projection equipment. There were voices in the distance. Bodaken's stomach tightened. Making his way to the backstage area, he found Zimm at the controls of the machine. In the

HEFT!

Please be aware that some 30 limited-edition Rick Sternbach prints were stolen at the 1978 WorldCon in Phoenix in September 1978. These include the covers for RINGWORLD, A GIFT FROM EARTH, TALES OF KNOWN SPACE, WORLD OF PTAAVS, and NEUTRON STAR. These prints are large, full color dye transfer prints, resembling 20 x 24 inch semi-glossy photographs. All prints have Rick's signature on the lower right side, and are uniquely numbered on the left. I will provide a list of the missing numbers to any interested party.

- *There are only four legal sources for the Sternbach prints: myself, Rick, the Other Change of Hobbit bookstores, and Dream Masters gallery. Beware of anyone else offering these prints for sale.*
- *Any information which leads to the return of the missing prints or the arrest of the thieves will be well rewarded. Write me at the below address if you have information, or would like a list of the missing prints.*

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backstage shadows, Zimm's hands seemed blurry as they raced between dials and levers. The little lights on the control board flashed in varying patterns. Bodaken stood next to Zimm, who at the moment was not speaking. He was listening to sounds coming over earphones. His eyes were glazed in concentration and he did not see Bodaken. He looked instead out the one-way glass panel that gave him a view of the performing area and the audience. Suddenly he leaned down and whispered into his mike.

The voice was still Zimm's flat New Yorkese, but the inflections were recognizably Wanda Lake. Reluctantly, Bodaken looked over Zimm's shoulder at the audience area. He could see the lovely arched back of the Wanda Lake figure, the red hair cascading down over her narrow shoulders. She was leaning forward toward Marcia, who was now quite animated and speaking fast. He could not hear what she said.

"That may be true, Marcia," Zimm said into the microphone. "But it's also, like we say, show biz."

Bodaken tiptoed away from Zimm, worked his way to the side entrance of the Ginjer Snappe Room. He opened the door carefully, immediately heard Marcia's voice. He edged closer to her. As he approached, the Wanda Lake projection said:

"I died? I guess I died. You know where I died? Onstage. Anything after that, I can't tell you."

"They never let me see you," Marcia said. "Never. I ran away, almost made it, but they caught me. I would've found your room. Climbed trellises, whatever."

"That would've been good, fine. I wanted you there."

"I know. I could feel it. Like as if you were calling to me."

"I was. I just didn't—"

The Wanda Lake projection stopped talking, raised a hand to her forehead, shielded her eyes. She seemed ready to cry. Bodaken found the gesture intriguing. Even in her saddest ballads, Wanda Lake had never faked a tear. The emotions she put into songs were all honest and never faked, it was part of her legend. If they were faked, they were done so well they had no correspondence to conventional show business techniques.

"It's okay, momma," Marcia said.

"No, it ain't. It's—"

"Take it easy. I'll—"

"My own mother, she was not distinct for me, Marcia, she was—"

"No, stop. Things are okay now, we can—you've got to tell me—God, I don't know what to do, I've got so many things to—"

"Are you really Wanda Lake's daughter," Bodaken said. The question surprised him, he had not known he was going to speak.

The Wanda Lake appeared angry. It was a fierce Jackie Zimm kind of anger. Marcia seemed ready to fold up, but she said:

"What's it to you?"

"Sorry I asked. I shouldn't interfere. But I'm afraid."

"*You're* afraid?" the Wanda Lake said. "Of what?"

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"I'm afraid of what happens when Marcia finds out this is not real," Bodaken said.

"You bastard!" the Wanda Lake said.

But Marcia laughed. A happy laugh, genuine amusement.

"Go away," she said. "Everything's okay here. You don't have to worry about what's real. Maybe I'm not real. You ever heard of Wanda Lake having a daughter?"

"No, well, matter of fact—"

"Maybe I'm faking. Maybe I'm not Marcia. Go away, we don't need you."

Still smiling, Marcia approached the stage. Her hand reached for the hand of the Wanda Lake figure. It passed through the outstretched hand once, then reversed the movement and passed through it again. Looking away, Bodaken could see Nadle standing across the way in the shadows. Perhaps leaning against a wall, perhaps not. He could not make out the expression on the waiter's face.

"You're still here," Marcia said, pleasantly.

"Of course I'll go away," Bodaken said softly. He started to go, then turned back toward the stage, for a moment could not decide whether to address the Wanda Lake projection or the one-way panel behind which Zimm sat. He finally looked off to the side and talked to neither.

"Hey, Zimm," he said and did not wait for a response. "I talked to Strang. He's gonna take you on. You'll get contracts in the mail."

The Wanda Lake figure looked over her shoulder and spoke toward the panel.

"Don't sign them, the contracts, darling. No reason to turn whore just for him, just for Bodaken. Or Strang."

The figure looked back at Bodaken.

"No reason to be a whore like this dumb sonofabitch."

He inflected sonofabitch just like Strang did. Bodaken chose not to comment on that, but said instead:

"No more whoring for me. I quit Strang. I'm on my—"

"Quit?" the Wanda Lake said. "No, you didn't. I don't believe you. You don't mean it, darling."

"No, I do. I really mean it."

The Wanda Lake projection laughed. Marcia joined in happily.

"Really," Bodaken said. "Really."

The last *really* came out weakly. Marcia and the Wanda Lake kept on laughing. Nadle had turned away, as if to hide laughter. Bodaken turned and made his way through the Ginjer Snappe Room and out the entrance as fast as he could walk. He stopped at the front door, hesitated as he saw that the rain was coming down hard again. Behind him, he heard some scratchy music begin, and the voice of Wanda Lake singing her trademark song, "My Worries Are Over." She sang about having faced all her problems, having no more problems to conquer. Bodaken suddenly realized how much he hated the song, had always hated it. ■

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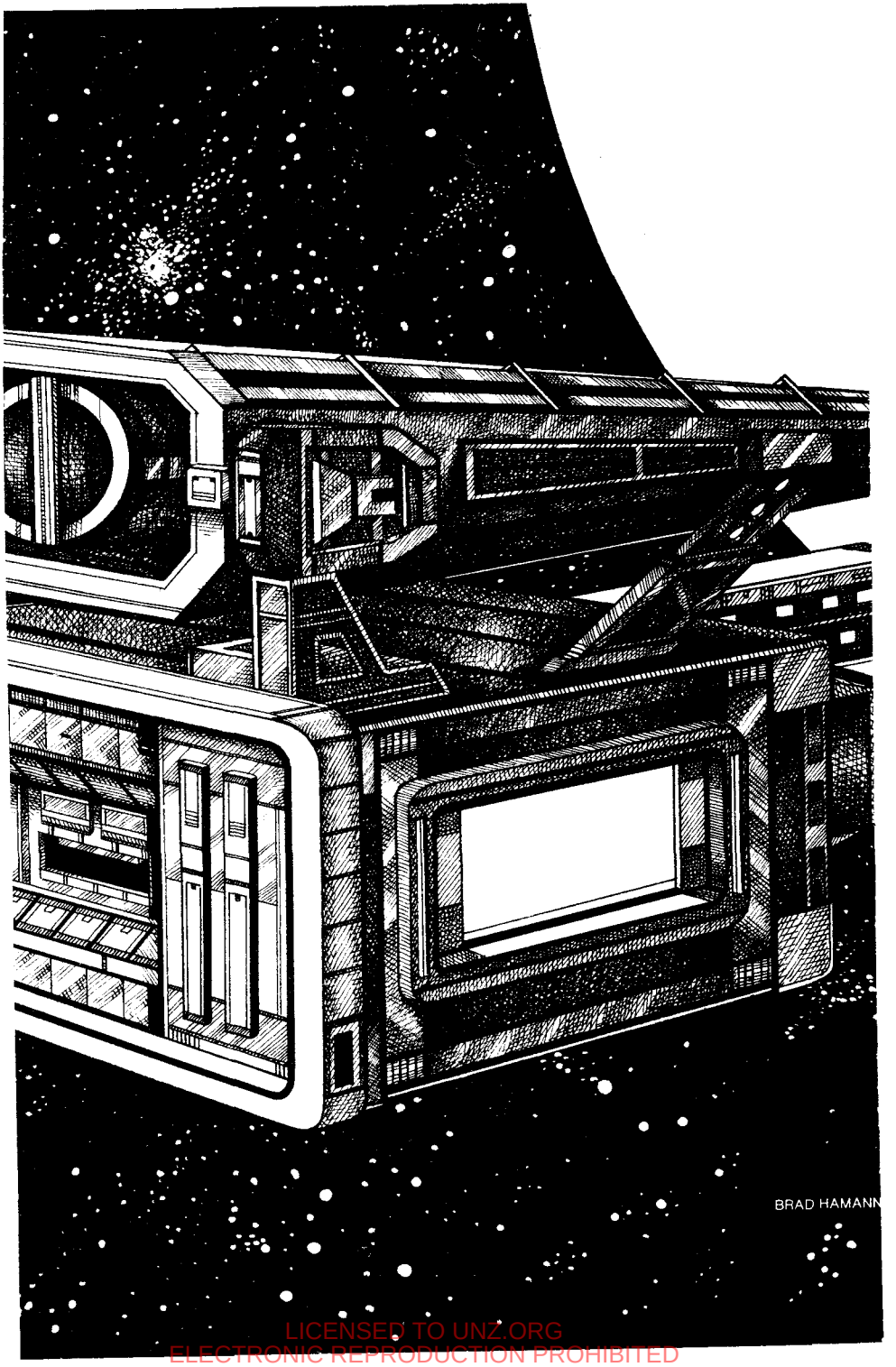

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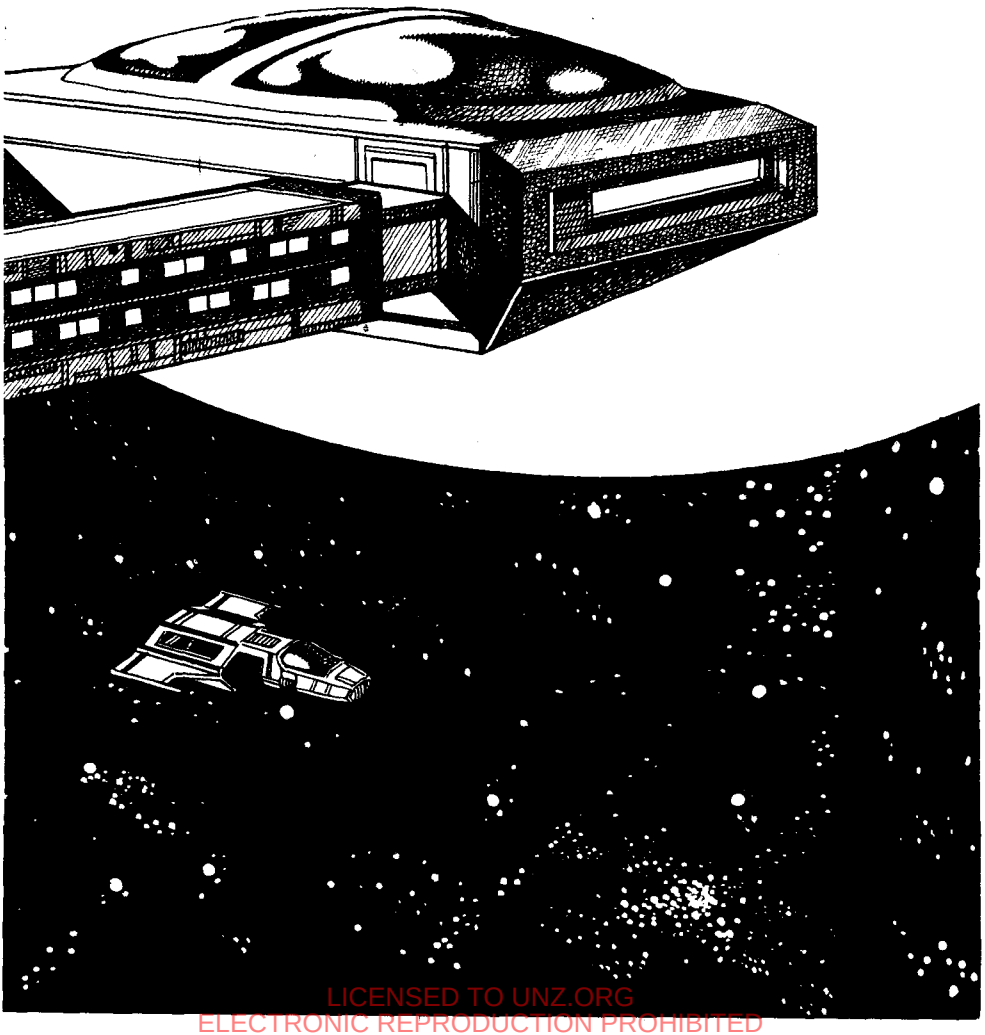
TRIAD

It's difficult to decide if an extraterrestrial species is intelligent—especially when the investigation is driven by emotion.

SAM NICHOLSON



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Even after he became Bard Laureate, Vardos Vayan thought of himself primarily as a Thespian. His twelve years of trouping the Proxima Circuit had trained him well. Of all his achievements—public and not-so-public—he was proudest of being First Player in his own repertory company.

The critics liked to say that Vardos could not be upstaged—an odd observation, since Vardos was the gentlest-spoken Thespian who ever trod the boards. When he directed his troupe, even the humblest role became a gem which glittered all the more for being part of a brilliant design.

An ungrateful comedian once tried to milk a role at the Bard's expense. The comedian's behind-the-back jape roused surprised sniggers, but thereafter his timing seemed off—his clowning fell flat—yet the sharp-eyed critics could not say exactly what Vardos was doing to damp him down.

When Vardos eventually was upstaged, it was by an event, a phenomenon . . .

The Bard Laureate's troupe was playing the summer amphitheater in the middle Rockies. The late evening was warm, as were most evenings since the Glacial Melt. The stage was a brightly-lit, color-vivid box facing an audience hitherto intent upon the play but now gaping at the starry splendor over their heads.

Vardos, involved in the third-act climax, became only slowly aware that the audience was no longer with him. Abruptly the footlights and spots went out. Vardos stood still, momentarily blind.

A glowing silver disk drifted over the darkened amphitheater, pulsing beads of red, green, and gold. Suddenly the saucer unleashed a white blaze that flooded the amphitheater.

Vardos felt stunned, as if all life was being drawn out of him. He felt angry, too, thwarted of his Thespian triumph. Exerting what strength was left in his lithe muscular body, he sprang to the dead footlights, shook his fist at the saucer, and declaimed in a voice that rang over the unnaturally-hushed amphitheater,

"Since history's molten dawn has Earth been plagued
By Probes! Unmanned, unthinking, unaware
That simple folk would worship robot gods—
Apollo in the heavens, Olympic Zeus!
O cursed be star-minds that with madness strew
Poor worlds, to probe and peer and coldly view!"

As if obedient to the shaken fist, the saucer cut the blinding beam and drifted away.

The stage lights went on, and the amphitheater became a muddled blur of sound. Vardos knew there was no way to reenchant the audience. The mood had been destroyed. However, the customers had paid to see a full performance. He started the replay at the beginning of the interrupted scene, and gradually the audience settled down.

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The curtain calls were conscientiously given and received—and the wretched evening was over, although the Bard's troubles were only beginning. As he ambled, preoccupied, into the wings, his manager, the dapper George Apfelstein, stopped him with,

"You shouldn't have burst out *ex tempore*, Vardos."

"I was beside myself," fumed the Bard. Seeing Apfelstein's serious countenance, he added, "What's wrong?"

"Dyke Ter Hetz left his seat. Apparently you've finally given him an opening."

Vardos frowned. Dyke Ter Hetz was a mediaman who opened victims the same way a seagull opens clams—by jabbing through the shell-crack of least resistance. For several weeks Ter Hetz had been stalking the Bard, to the troupe's general puzzlement. The master of the loaded interview usually preyed within the political arenas.

The Bard considered what he remembered of his outburst against the saucer. "I uttered no slanders. Or rather," he smiled to Apfelstein, "Apollo and Zeus are no longer around to sue."

"You don't know how far Ter Hetz will extend your wild statement," protested Apfelstein. "If he jumps from Apollo to Ezekiel—"

"He won't jump where he can't drag me after him, and he knows I refuse to be slanted to offend conservative believers. I admit I can't figure out what Ter Hetz wants of me. I have no wealth or power."

Backstage atmosphere is seldom both leaden and excited, but the aftershow visitors were hectic about the UFO, while the players were depressed over the punctured performance.

As Vardos strolled up to the door labeled First Player, he saw that several evening-suited men were waiting in front of it. A small media chorus backing up the central figure, the noted newsmaker. Vardos reflected that Ter Hetz looked like a gaunt scarecrow topped by an elongated pumpkinhead. Ter Hetz's eyes were deep hollows, his cheeks were furrowed, his nose knife-sharp, his mouth a slit that could become mobile with quick comment.

"Mr. Ter Hetz—media gentlemen—good evening," said Vardos courteously. "May I step out of character as we talk?"

He entered the dressing room, Ter Hetz and the group crowding after him. Vardos stepped behind a woven-birch screen, where his dresser, an Apprentice Thespian, was waiting to help him out of his classical costume.

"Upon my word, gentlemen," joked Vardos, from behind the screen, "the saucer was not part of the performance."

Ter Hetz's voice, which always reminded the Bard of the flick of a serpent's tongue, responded, "Your displeasure was obvious, Bard Laureate. *Cursed be star-minds*—! To be specific, which minds?"

"Come now, Mr. Ter Hetz," parried Vardos, mystified. "A Bard doesn't explain his iambic pentameters.

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That's what critics are for."

"But you must have been visualizing specific minds."

"Must I?"

Vardos drew on an open-necked coverall and reappeared while his dresser carried off the costume.

Ter Hetz was holding up his pocket recorder. Vardos could hear his own voice—*unmanned, unthinking, unaware*—and felt again the laming power-drain. He realized he was exhausted. He had to get rid of Ter Hetz. What did the confounded nuisance *want*?

Vardos sat at the dressing table and smeared solvent over his greasepainted face. Ter Hetz had stopped the recorder and was saying, "You insist these probes are unmanned?"

"I don't *insist*." Vardos looked at Ter Hetz in the light-rimmed mirror. "I merely think it likely."

"You imply, people who report talking to UFO crewmen are liars?"

Vardos paused to wipe the glutinous film from his face. "I imply nothing of the sort. Witnesses might be encountering robots—waldos—DM-in-the-round—"

"Could you clarify that last?"

"By Thespis!" swore the exasperated Bard. "What a scurvy job you have! I'd sooner starve than live by crucifying men on uncrossed t's!"

Ter Hetz, his long, furrowed face unmoved, repeated, "I'm only asking you to clarify."

Vardos said doggedly, "DM-in-the-round. For example, the Earth Council meets weekly, but not in the flesh. Each member enters his conference room, sits in his assigned chair at the conference table, activates the Dimensioner—and images of the other Council members appear around the table. Thus might FTL images be sent from another star system, as we send tachyon-Morse-beams between Sol and Proxima.

"Actual matter-particles might be ported by an advanced civilization," Vardos went on, "forming robots as needed, oriented to resemble the intelligent life of the planet being studied. When you come to think of it, other star systems probably have other life forms."

"You are saying nonhuman intelligent life exists?"

Vardos was feeling numb. He replied carefully, "Despite the fact that the Proxima planets were empty wildernesses, I believe intelligent life exists in other star systems."

"Have you ever met intelligent extraterrestrials?"

"Why, no."

Ter Hetz's sharp features became even sharper. The Greek chorus behind him straightened up, like jackals waiting for the lion to make the kill. Vardos wondered—in no little panic—what he had said that could be so fatally slanted. His wits groped their way along.

"Why consult me about extraterrestrials? I've merely traveled the Waystations and the Proxima planets. I'm not competent—"

"Not competent?" jabbed Ter Hetz swiftly. "The Star Bard? The Voice of

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Space Travel? The most eminent Guardian of the Dhaulagiri Star Launch Track? Not *competent*!"

Vardos had to remain silent or be accused of quibbling. He remained silent. Ter Hetz pursued, "I ask again, in your long years in space, have you encountered sapient extraterrestrials?"

"In my limited—very limited—experience, no, I personally have not—"

"Thank you, Bard Laureate!" Clearly triumphant, Ter Hetz pocketed his recorder, bowed, and exited, followed by his sycophants.

Vardos mechanically poured lotion on a clean towel and stroked his solvent-clogged hairline. What had he *said*? Apparently, despite his reassuring words to George Apfelstein, he had been worrying subconsciously about offending against traditional mores. Relieved that Ter Hetz had not extended Jove's thunderbolts to Ezekiel's wheel, he had fallen unwarily into Ter Hetz's carefully-laid trap.

Thinking back, afterwards, Vardos decided he had been too saucer-numbed to respond with his usual alertness. However, the truth lay in the fact that Vardos was a Star Man. His space horizon started at the Asteroid planet Vesta and stretched to Proxima and beyond. He had completely forgotten a planet in his own backyard.

In the neighborhood that stretched from Post-Melt Earth to Proxima Centauri, there was altogether too much news. Whereas Pre-Melt Earth had caught an hour of TV-summation, Post-Melt Earth needed twenty-four hours at the DM console. The FTL tachyon-Morse-beams brought Proximan news within minutes—and the four planets were by no means the boondocks.

Consequently, most Earth dwellers subscribed to a transcript service that delivered printed folios of selected topics. The most popular folio was *General News*, but *Commerce, Sports,* and *Politics* were also in demand.

During his season as a touring Thespian, Vardos had to rely on the transcripts to which the various rotundas and amphitheaters subscribed. He used the DM-consoles for communication rather than for information or entertainment, although he occasionally watched a fellow-Thespian on the tube.

Early the next evening, before leaving his residence cubicle in the amphitheater's thespian quarters to report for the performance, Vardos scanned the day's just-delivered folio. He saw that Dyke Ter Hetz had not made *Headlines*, and he was in too much of a hurry to read further.

Hence he missed an inconspicuous general news item—that the Use Mars Now committee had held a special meeting on the Moon.

The following day also was silent on the subject of Dyke Ter Hetz. Increasingly uneasy, Vardos spent an hour, after the evening's performance, coding the DM-console in his cubicle to

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replay such items as might give a clue to Ter Hetz's activities.

Extraterrestrial yielded only an item about an unmanned Earth probe to Sirius. *Intelligence* got a NEGATIVE response, which, Vardos reflected, might be only the computer's opinion. *DM-images* and *matter-porting*, being of current interest, were certainly in the news, but not in any controversial context.

The blow fell on the third day. Vardos, snatching an hour's sleep before the evening performance, was roused by George Apfelstein, who stormed into the Bard's cubicle, wing-coiffure awry, satin cummerbund taut with emotion.

Apfelstein dropped heavily onto the edge of the bunk and poked the drowsy Bard. "Vardos! The UMN are calling for a boycott of starship deliveries until their demands are met! They claim you're encouraging them!"

Vardos sat up, groggy. "The United Mine Nexus—?"

"Of course not! As if the asteroid miners care about your confounded *ex tempore* remarks—! Wake up! The Use Mars Now industrialists are demanding the planet be opened for exploitation! Until they're allowed in, they're calling for a boycott of parts and services to the starships!"

Vardos came out of his drowse like a startled tiger. A threat to the starships—!

Mars! He had completely forgotten the red-dirt planet. Pre-Melt Earth had posted Mars off-limits because of possible microscopic intelligences. Post-Melt Earth had bypassed Mars and built Waystations to Proxima Centauri. With the discovery of four empty, habitable planets circling Proxima, Mars had lost all urgency. A Biological/Conservation Patrol orbited the planet, but otherwise it was a forgotten backwater.

Only, Dyke Ter Hetz had remembered. When the Bard had so heartily cursed extraterrestrial intelligence, Ter Hetz had remembered the controversial, patrol-protected Mars lichen and the UMN industrialists who were trying to invalidate the intelligence factor.

No wonder Ter Hetz had exulted, "Thank you, Bard Laureate," when Vardos, thinking *beyond* the Sol system, had said he did not know of any extraterrestrial intelligences! Ter Hetz had taken the half-statement to the UMN, and on its basis they were threatening to stop the starships unless Mars was decontrolled.

Apfelstein held out the folio. "Do you want to read Ter Hetz's report?"

Vardos shook his head. "I realize my mistake. I had forgotten the Mars lichen, and Ter Hetz zeroed in with FTL speed."

Apfelstein consulted the antique stem-winding timepiece pinned to his brocaded jacket. "And now I suppose you and Ter Hetz will be trading statements and counterstatements—"

"Don't worry, George," smiled Vardos. "I won't miss the performance."

Apfelstein looked doubtful, but he

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rose and left the cubicle. Vardos threw aside the bubble-quilt, got out of the bunk, donned a silk wrapper, rummaged in his dressing case, and found a DM scrambler. His "honorary" title of Starship Guardian masked a quiet, deadly undercover Security agent.

Vardos inserted the scrambler into the communication panel, tapped out a code and waited.

The tube flimmered for several seconds, then cleared to show a gray-haired, blunt-jawed man in a gold-braided blue uniform.

Vardos grinned, "Good evening—or morning—Colonel."

"Vardos, you superidiot!" barked the Dhaulagiri Colonel. "To go Bard-dreaming when Ter Hetz was sneaking up on you—!"

"I'm not sure who is sneaking up on whom," returned Vardos. "When coincidence piles on coincidence, I look for hidden strings."

"What sort of coincidence?"

"Ter Hetz's timing. The hour, the place, and the victim, all together."

"Luck," grunted the Colonel.

"I pray you, take thought a moment," begged Vardos. "Why was Ter Hetz stalking me? He's known me for years—and discarded me as story material. I make news from time to time, but Ter Hetz deals in sensationalism. Under-the-table graft. Backstreet adultery. It wouldn't surprise me to find out that Ter Hetz earns as much from blackmail as from publishing. Why, then, did he come here to fish in empty water?"

The Colonel pondered. "Because somebody paid him to stalk you until you blurted out something he could slant and twist to a specific purpose?"

"Yes. Ter Hetz would have to be paid to neglect his usual sources of income."

"What you're saying is that the Use Mars Now industrialists paid Ter Hetz to con you into an ambiguous statement about the lichen."

"I believe they paid Ter Hetz to secure *any* statement that could be misconstrued and capitalized upon, and Ter Hetz saw the possibilities in a Star Bard whose utterances generally are poetic and ambiguous."

"Ambiguous, I'll go along with," muttered the Colonel.

"So there was no coincidence at all in Ter Hetz's presence, was there?"

"No," admitted the Colonel. "But the UFO was a coincidence."

"Was it?"

"There you go, Bard-dreaming again! I can assure you, Vardos, the UMN does not—repeat not—own any flying saucers. The Mars Patrols keep a very wary eye on the UMN—"

"I never supposed the UMN dashed around in saucers. But there are two sides to the Mars dispute. The UMN—and the lichen."

"What! Do you honestly believe there's an intelligence factor in a mess of meandering cabbage—"

"Which has managed to hold off greedy Earthmen for two centuries? Yes, I do. At any rate, I think I'll go out there and talk to it. If you'll expedite my trip with the Mars Patrol,

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Colonel," Vardos said politely.

"You're drunk. Beakered to the eyeballs. Are you saying the *lichen* sent that damned saucer?"

"I don't believe any UFO is *sent*. Ported, perhaps. Figuration-inswept. Thus, Colonel, if the lichen are intelligent—and two centuries of Mars research can't be all that wrong—"

"Vardos, the whole crux of the matter is that the Mars expeditions never were able to do any research because of the fatal dirt storms. Reports from the survivors are mere legends—"

"But the legends are consistent in reporting that the storms—the sudden atmospheric disruptions—killed only persons who had tried to walk upon the lichen or dig them up. In other words, the deaths were selective, along rational lines.

"Surely, Colonel, the famous expedition of 2005 is more than legend! The group was led by fully-qualified psychologists who set up a mental-attitude reaction-probe consisting of Lichen Friends and Lichen Enemies—"

"Hard-labor convicts, the lot of 'em! Pardoned and paid fortunes to take part in the experiment!"

"By the year 2005, everyone knew the danger of showing aggression to the lichen. The scientists had no choice but to pay prison volunteers to be the Lichen Enemies. What subsequently happened is clear enough. The dirt storms—the so-called Warning Storms—kept the expedition in orbit for weeks. Then, all of a sudden, the storms ceased. The expedition landed. Friends and Enemies—intermixed and identically spacesuited—approached a specific lichen area, the Enemies intending to advance into the lichen while the Friends stopped at the edge.

"Well, before they could come that far, an explosion—or implosion—knocked them senseless. When the dust cleared, all the Friends were unharmed, all the Enemies had suffered concussion and temporary paralysis *except one man,* an undercover agent put among the Enemies as a control factor."

"Yes," interrupted the Colonel, "and the next expedition hit a dirt storm that wiped them out to a man. So the 2005 fiasco didn't prove a damned thing!"

"Colonel, you can't dismiss the *selectivity* of the 2005 lichen reaction. They knew *beforehand* who were Friends and Enemies. They knew the attack was an *experiment*—and stopped it before they had to kill anybody. They even knew one man was a harmless control factor, and they left him alone. The destruction of other expeditions doesn't invalidate the 2005 experience.

"Granted, those early expeditions have become more legend than fact—but right up to modern times the Mars Patrols have insisted the lichen demonstrate intelligence. Why not? No cosmic law says intelligence has to be a matter of cranial capacity or gray cells. Lichen intelligence could be subatomic—a nexus within certain nuclei—in which case, the lichen

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could be intelligent beyond human understanding."

"If they're so damned intelligent, why did they send a saucer to irk you into shooting off your mouth just when Ter Hetz was laying for you?"

"Well, they could hardly foresee I'd extemporize. I believe they keep informed of all UMN agitation and hence knew of Ter Hetz's employment. But I doubt that their knowledge went so far from the Mars nexus that they knew Ter Hetz had chosen me as his victim."

"Then why did they send the saucer?"

"If you'll pardon my self-assessment, Colonel," smiled Vardos, "I think the lichen decided they needed a Security Guardian, and they chose the Guardian most discussed by the Mars Patrol. When they discovered the Guardian was a Thespian, they infigurated their UFO to break up his act, anger him, and *involve* him. The best way to ensure a policeman's full attention is to throw a brick at him."

"Tchah!" snorted the Colonel. "Self-assessment! When are you heading Marsward?"

"I'll instruct my understudy tonight and catch the Denver shuttle to the Moon tomorrow—with your permission."

"Yes, yes." The Colonel scowled. "But there *was* a coincidence, after all, if both Ter Hetz and the lichen decided to draw you into the hassle."

"Who else more appropriate? I *am* the Star Bard, and a man must suffer the consequences of fame."

"Suffer the catfish!" barked the Colonel. "The lichen are plain lichen, and the UFO was fortuitous. If the Star Bard doesn't achieve positive results on Mars—by which I mean a rescinding of the parts-and-services boycott of the starships—the lichen won't be the only life form throwing bricks at him!"

He cut the sending. Vardos smiled, removed the scrambler, and taped a call to his understudy.

Only the express starships lifted off from Mount Dhaulagiri in the Himalayas, making a short stop at Vesta before revving up to full speed along the Waystations, 5.5 years to the Proxima planets.

The Moon was the staging area for all cargo shipments and for intra-Sol destinations. Consequently, Earth/Moon traffic inched along bumper-to-bumper in a double-helix pattern continually sidewinding through the Moon/Earth cycles. Each shuttle from the many Earth launching tracks—each cargo robot blasting vertically from the industrial vents—was put into a holding pattern before being admitted to the helix, and the Moon journey took eighteen wearisome hours.

Vardos, playing his role of Anyman, slouched aboard the Denver shuttle clad in a well-worn travel jumpsuit and carrying a shabby fabric flightbag. He quickly slipped into his recliner and kept his face averted in a news folio until the other passengers had clamped down for the shuttle lift-off.

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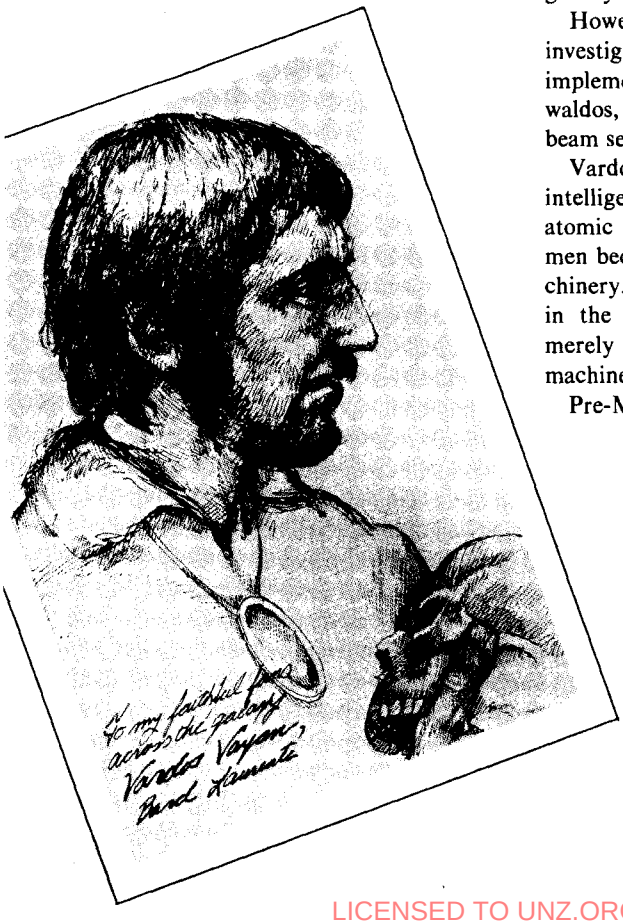
Ground-thrust accelerated the shuttle off the track, mid-thrust put her into orbit, and the flashing *deck-gravity and all-access* lights freed the passengers from their recliner clamps and allowed them to wander throughout the shuttle.

Most of the passengers were regular Moon commuters who settled back with hand-viewers to enjoy the wide selection of in-flight tapes. Vardos swung from his recliner and drifted up the spiral ladder to the observation deck. He chose a chair facing the wide forward viewport, sat down and gazed with interest at the lanes/orbits of stacked-up traffic methodically snaking past the various telesatellites.



His mind strayed to the UFO which now had become of such immediate concern. He recalled that the confirmed/proven UFO sightings had been within the atmosphere. From sea level to 15,000 meters seemed to be the saucer range. Their abrupt stops and starts argued for their being images. Even Earthmen could make DM-in-the-round move in the same gravity-defying manner.

However, if the UFOs were an investigative medium, they had to be implements, in the mold of matter-waldos, and transmitters, like tachyon-beam senders.

Vardos decided that the concept of intelligent-energy control of cosmic/atomic forces was difficult for Earthmen because they were bound to machinery. In that respect Earth was still in the Stone Age. A starship was merely a sophisticated arrow needing machinery to propel it.

Pre-Melt Earth had become dissat-

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isfied with the word machinery, because it related back in time. If a steam engine was machinery, a computer had to be something more flexible, more advanced—and thus it became vaguely hardware.

But, after all, the computers—the nuclear-cartridge engines—the TV/DM cameras—were machines. Calling them something else was semantic self-deception. Science had not advanced—it had merely exploited and diversified Stone Age basics—fire and the wheel.

Just as the human body was an irksome, demanding husk protecting human intelligence, so were machines irrelevant crutches upon which mankind limped toward cosmic powers. A real scientific advance would discard the machine.

There was, thought Vardos, a latent species-memory of a time when fully-understood powers had become usable powers. The haunting half-recall had been the impetus for magic, wizard spells, alchemy. The old boys had been perfectly right in insisting that atomic structure could be broken down. Their mistake was in trying to break it down with gnat's blood and frog bones.

Vardos had never seen any reason to assume UFOs were from a specific system in the cosmos. Maybe a dozen—a hundred—worlds had the knowledge to assemble on-the-spot molecular constructions from the Earth's atmosphere. Maybe one of these worlds comprised highly-concentrated subatomic brains which, of necessity on a parched red-dirt planet, had discovered that an undemanding lichen-husk was enough physical support.

When mankind gaped foolishly at UFOs, he was like a chimpanzee gaping at a computer.

In his showman's soul Vardos's attention slipped to a stage scene where an enormous computer formed the entire backdrop, and a chimpanzee was trying to coax brightly-wrapped bon-bons from its maw by random punches or cunning observation of cause and effect. A clown/comedian for the chimp, of course—and songs—

Vardos Bard-dreamed until a cheerful female voice said, "Will you have your lunch tray served here, sir?"

He blinked and murmured absently, "De-serve I bread? The song is not yet sung!"

The flight attendant gasped, "Bard Laureate!" and then laughed, "Don't worry—we serve even the undeserving. Why not? *Remember, in the course of justice none of us should see salvation.*"

"Apt-quoted, Maid," smiled Vardos, reflecting that a Bard who had been topped by *the* Bard really had no possible comeback.

Despite steel beams interlocking and steadying the caves and tunnels, the Moon was a shaky affair, ever atremble. Moon residents lived with the nightmare that their cinder-mass would jiggle itself into clinkers and drift away, leaving only its intricate steel skeleton.

Therefore an effort had been made

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to equalize/disperse industrial vibration. The construction engineers claimed the Moon had, in fact, been improved and shored-up by its new inner ribs. As long as its orbit was not perceptibly affected, its residents were indifferent to occasional vibratory shocks. Vardos, who was a history scholar, thought their philosophical attitude resembled that of the Pre-Melt Earthmen living atop the San Andreas Fault—what was destined to happen, would happen, and meanwhile life went on.

The balance-principle applied also to the Transport Terminals—*Arrivals* Earthside, *Departures* Spaceside. Vardos was one of the last to leave the shuttle hatchway and start down the ramp to the cross-Moon tunnels. As usual, the first-time passengers, feeling tipsy in Moon gravity, were lurching along the handrails at the sides of the ramp, while the commuter flow proceeded at the easy, bounding, Moon glide.

The Moon always looked grubby, thought Vardos, merging into the commuter flow. The white-walled tunnels were high and spacious, but their white ceramic tiles seemed to pick up a sooty film from the black cement deck. Moon residents were huffily insistent that the Moon was of *dirt,* not *dust,* yet the least flaw in construction quickly oozed fine soot.

Moon visitors called the tunnels "rabbit-warrens," "gopher-holes," or "catacombs." Certainly the uninitiated were easily confused by all the adits, lifts, and side-ramps. Vardos bounded through an archway labeled *Staff—No Admittance,* and descended a steep spiral ramp to a steel-fenced loading platform. On the track beyond the fence was a robot Transport capsule.

Vardos pressed his thumb against a metal tab in the lock-panel of the fence-gate. The tab withdrew for several seconds, clicked into position again, and the gate opened, closing as soon as Vardos was past its counting-beam.

He entered the capsule, programmed it for the *Mars Departure* track, and relaxed as the capsule whined at near-sonic-barrier speed through the tunnel.

Presently the capsule slowed, emerged onto another loading platform and stopped. Vardos climbed out, entered a lift cage and traveled upwards to an above-surface waiting room with a view-wall over the Spaceside marshaling yards.

The cage had come silently up the shaft and into the chamber. Through the cage bars Vardos could gaze past the grouped chairs and see the panorama of blazing yard lights. The launch tracks were shorter and steeper than on Earth. The brilliant scene was always dramatic against the blackness of Outer Space, but for once the Star Bard's horizon began and ended thirty feet from his nose.

Standing at the view-wall, her attention wholly turned from the chamber and the lift-cage, was a blonde-coiffured woman whose blue-velvet cloak hung from her shoulders to her

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silver boot-heels. Intent on the marshaling scene, she did not hear Vardos step quietly into the chamber.

He tossed his flight-bag into one of the chairs. The soft thump startled the woman. As she swung to face him, Vardos could see that her blue cloak covered an iridescent silver jumpsuit.

He approached her, wondering who she was and why she had been permitted into a Security area.

She smiled at him, with the slightly arrogant assurance that comes from years in a command position. Her blue eyes were carefully made-up, her skin was firm and fresh, but her cold composure betrayed that she was no longer young.

"Bard Laureate!" she exclaimed in a clear, businesslike voice. "So the Patrol is taking us both to Mars!"

"Is it?" smiled Vardos in return. "You have the advantage of me, Lady. Have we met?"

"Forgive me—on the Moon we all know each other. I'm Director Couay, of the Industrial Council."

"And a member of the UMN, I warrant." He paused, then added, "Under what authority do you travel to Mars?"

"The Moon Office of the Mars Patrol," she said smoothly.

Vardos studied her a moment. Her smile was too self-satisfied. She was altogether too pleased at her own cleverness. Why had she set off an alarm bell in his brain? Where had he encountered—?

He searched his memory swiftly. Yes, long years ago, when he was a young student playing the Proxima Circuit with Joe Humber's repertory troupe, he had been victimized by just such a cool conniver. Joe had been victimized, too, which had been no mean feat. Somehow male logic was no match for feminine wiles, once a woman decided to run a double bluff.

The incident which Vardos was remembering had happened when the troupe was several years into space, and Joe Humber was producing plays written by the aspiring young Bard. One day a woman Player had come to Vardos and said, "Joe is grumbling about the second-act quarrel and thinks more should be made of my tantrum. But when you rewrite it, Vardos dear, don't ask too much of my poor talents. A little extra business at the proscenium arch—"

She had spoken with such offhand assurance that Vardos had agreed to rewrite. Thereupon she had gone to Joe Humber and said, "Vardos has a terrific idea for enlivening the second-act quarrel, but he's shy about asking you to change what we've been rehearsing. I dread learning new lines, but maybe you'd better—"

She had played superbly upon the psychology of the situation. Joe *did* grumble and give informal orders through whoever happened to be with him at the time. The student Bard *was* shy about suggesting production changes. As a matter of course they fell for the double bluff, and the ambitious woman received the "extra business" she had schemed for.

Later, of course, when Joe and Var-

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dos had time to compare notes, came the I-thought-you-ordered, and she-told-me-you-wanted awakening.

Vardos had never forgotten the incident—the woman's bright, self-satisfied smiles, the hint of gloating contempt. He realized he was now seeing the same emotions in Director Couay. He said to her,

"It's been a long time since I was green enough to fall for a woman's bluff. The Mars Patrol Office had never heard of your trip to Mars before you went there with the tale that I had sent for you."

Her smiled faded, but she did not speak. He went on, "How did you convince the Patrol Office? None of them were born yesterday, either."

"I had your arrival data, with the Dhaulagiri code," she explained, regaining her coolness. "The Industrial Council has its own Security officers and spying techniques. You didn't hope to board the Denver shuttle unobserved, did you?"

"I had hoped to be inconspicuous. Had I intended to be *unobserved*—with all my Thespian tricks—your spies would have shadowed me in vain. Are we at war, that I must come here with armor and camouflage?"

She turned again to the view-wall. "The Moon has been exploited to the limit. Vesta is a small planet with scarcely room for one more dome complex. And meanwhile Mars sails undisturbed through space—empty, desolate, dead."

"Except for the lichen."

"Except for the Mars Patrol," she corrected him. "You've never been aboard a Patrol ship, have you? I wonder what you'll make of it."

A track in the marshaling yards suddenly had been outlined in red and green. Beyond the white glare, and so low to the Moon's dirt that it seemed to rise over the horizon, came a configuration of landing tugs coaxing a massive ovoid onto the outlined track, stern tubes first. The ovoid slid easily into place and was hauled sternwards into the radiation-attraction chamber known as the gamma-catcher.

The Patrol ships had the threshold-of-light starship engine but usually puttered Dead Slow to destinations short of Saturn. They had more inner capacity than they needed for routine patrolling—the small crews rattled around in three tiers of space—but they were designed for emergency abandonment of starships and space wheels, when several thousand people might have to be accommodated aboard.

The Mars Patrol was the oldest—and certainly the least active—of the Patrol Service. Vardos had heard it referred to as Noah's Ark, with sub-references to barnacles and Flying Dutchmen. While he mused over Dame Couay's last remark, he heard her say impatiently,

"Well?"

"Well what?"

"What about *me*? Am I a zero of no further interest because you stupidly did not include the UMN on your schedule? With absolutely no data, you apparently have prejudged the

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Mars case in favor of the Patrol."

"Perhaps, of the lichen."

"They are one and the same," she cried, with an angry fling of her cloak. "Have you never heard of self-perpetuating bureaucrats? Of sinecures cosily dug into departmental woodwork? In order for there to be a Mars Patrol, there has got to be lichen!

"For two centuries a privileged Service group has waxed fat upon discovering intelligence in lichen," she continued. "Do you think they can be blasted out of their sinecure by anything less than Dyke Ter Hetz and boycotts and bluffs? In your capacity of Starship Guardian, Bard Laureate, have you stopped short of tricks—even of murder—?"

"To destroy a real threat to the starships, I stop at nothing. However, I'm hardly so drastic about my personal prejudices." He thought a moment. "Very well, Director Couay, I'll let you come along to Mars."

She took a deep breath but seemed too agitated to thank him.

While they had been speaking, the lift cage had descended. It now rose into sight and stopped to emit a young officer uniformed in the brick-red and gold of the Mars Patrol. He clicked his heels and said,

"Bard Laureate, welcome! Captain Esperly requests a half-hour delay in boarding."

"I wouldn't dream of telling Captain Esperly how to run his ship," smiled Vardos. "Technical complications?"

The young officer looked embarrassed. "I couldn't say, sir."

"But *I* can say," interposed Dame Couay wryly. "The good skipper needs a half-hour to round up the tricycles, impound the roller skates, and wash the sticky fingerprints off the bulkheads. He has a *family* ship—and I daresay the wives already have rushed ashore into the shopping adits, and the female crewmen on board have morning sickness, while the males are busy folding diapers."

Vardos had to laugh. It was true that the Outer Sol Patrols were given permission to bring their families aboard, and family ships were in a class by themselves. However, Mars was a local area. He asked the officer, "Why are the families aboard? Surely it would be simpler for them to live on the Moon, since the Mars orbit is only hours away, at the slowest speed."

"Tradition, sir," replied the officer. "Two centuries ago, when the Patrol was established, Mars was two years away and the crews signed on for five year hitches, with permission to take their families. Since then—"

"The perquisite has been maintained," interposed Dame Couay again. "You, yourself, Lieutenant, are probably fourth-generation Mars?"

"No, ma'am," answered the officer evenly, but his ears had a tinge of pink.

Vardos disliked watching Dame Couay use the young man as a whipping boy. He thanked him, dismissed him, and was silent until the lift cage had removed him from the chamber.

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Dame Couay's mouth was curled in contempt. "What a weak-kneed, wishy-washy investigator you are, Bard Laureate! You knew very well the lieutenant was lying—and you patted him on the head and sent him away!"

"It was such a small, venial lie," smiled Vardos. "Probably an uncle on his conscience."

Dame Couay's "Tchah!" was even more forceful than that of the Dhaulagiri Colonel.

Vardos went on, "The personnel aboard the starship have no real connection with the lichen, which may quite honestly be intelligent despite the bureaucracy that has been built up around them."

Nevertheless, he had to admit to himself that Director Couay had scored a point by proving that it was to the interest of the privileged Mars Patrol that the lichen should be considered intelligent.

Captain Esperly was a relatively young man with a frank, friendly countenance. He spoke quickly, with frequent stops followed by a widening of the eyes, a lift of the eyebrows and a little half-smile, as if inviting his listener to share his own enthusiasms.

Whatever his domestic chores may have been, he seemed neat, trim, and brisk as he met Vardos and Dame Couay at the launch track's boarding ramp.

Vardos's shabby bag and the Director's considerable cases already had been sent aboard, and the usually time-pressed Bard felt almost on holiday as Captain Esperly greeted him heartily.

"Bard Laureate! A pleasure to welcome aboard a Thespian so often in our thoughts and conversations!" With a formal bow he added, "Dame Director! For all our sakes I hope you haven't come to cause disruption! The UMN, unfortunately, is ever our enemy."

"You might better have said *hereditary* enemy, Captain Esperly," responded Dame Couay. "I believe there's a tradition of Esperlys in the Mars Patrol."

"Quite right," agreed the skipper, showing no embarrassment whatsoever at this stab at nepotism. "Lichen-watching is an inherited knack, like glassblowing or playing the zither."

He widened his eyes at Vardos and continued, "Come aboard, both of you. I hope you'll feel at home, after the first disorientation wears off."

He escorted them through the airlock and into the vast and somewhat bizarre interior. The Patrolships were stripped down to null-gravity orientation, with simple magnetizing of the catwalks connecting the service areas suspended along steel flyovers. There was no up or down. For convenience when docked on the Moon, the living quarters were in related orientation, but lab consoles and control panels hung sideways or upside down, as suited their purposes, and there was no semblance of a deck, beyond the residence cubicles.

Throughout this immense hollow of intricate metal tracery was the touch

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of flowers—air plants that could twine endlessly around guardrails and girders. Vardos saw the lavender, pink, and gold of Earth orchids—the white, blue, and crimson Proximan bells—the massed, fine tumble of bright green ferns.

In the section they had entered was also the color and noise of children. Directly before them was a gymnasium, the exercise machines neglected as the children played with the novel force of Moon gravity. Far above, on a transverse flyover, two teenage girls—ruffled holiday blouses over bright tartan trews—were lashing swing ropes fast. Across the gymnasium a swarm of tykes, reveling in soft slippers instead of metal-soled boots, were climbing via handgrips for the fun of seeing how far out they could jump and how hard they could land on the padded grid.

"They *will* think gravity is a game," remarked the skipper, "and when they travel to Earth there's nothing but skinned knees, crankiness, and exhaustion."

"They should be raised on Earth," said Dame Couay.

"But then they wouldn't get to know the lichen, would they? We're not guarding robots or maintaining a zoo, Dame Couay."

Whatever the Dame might have said was interrupted by the appearance of a slim, Patrol-uniformed woman who emerged from a residence cubicle aloft and floated down to them, handgrip by handgrip, like a trapeze artist.

She landed lightly and bounded up to them, a boyish, short-coiffured figure with a lamp-tanned face, a shadow of freckles over a pert snub nose, a generous mouth and dimpled chin.

Captain Esperly smiled at the woman a moment before saying, "Dame Couay—Bard Laureate—my wife. Anita is Communications Chief."

As the mutual bows were made, he added, "Anita, my dear, show Dame Couay to her quarters. No doubt she wishes to rest before we lift out."

Dame Couay gave a start and drew back, casting a somewhat horrified look at the noisy children. Obviously the Director of the Industrial Council felt herself being shunted off the agenda. Captain Esperly said,

"Your mind can be easy, Dame Director. My wife is a mere newcomer to lichen-watching. Otherwise competent. We can meet later in grim debate."

The Director nodded curtly, folded back her elegant cloak and gracefully followed the skipper's Lady aloft.

Captain Esperly led Vardos through the next section and forward to the navigation area. Aft of the control bridge was a grid flare with a table and clamp-chairs—evidently a wardroom. They swung onto the flare, and the skipper asked,

"Join me in Waystation One Grape, Bard Laureate?"

Vardos nodded and smiled. Esperly reached up and slid aside the horizontal door of an overhead locker. Vardos ducked instinctively, but nothing fell out. The contents of the locker were

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secured to compartments of a vertically revolving belt. Esperly activated the belt and stopped it at a row of null-gravity squeeze bottles. He took two bottles, lobbed one to the Bard, dropped into a chair—automatically flipping the clamp shut—lifted the other bottle and said,

"To the starships, Bard Laureate! What has Dhaulagiri done about the Industrial parts boycott?"

The Bard had seated himself at the opposite side of the table. He squeezed a swallow of Grape into his mouth and savored the taste before replying. "Well, captain, the threat of coercion might cause the maddened UMN to destroy parts inventories. I assume Dhaulagiri intends to let the boycott be self-defeating. True, the Industrial Council can trade Sol/Proxima with their own cargo robots, but their workers won't stand for a block of the passenger starships. Especially those workers with a child or parent currently on the long trek. Eventually—"

"Eventually can be too long for the immediately-scheduled liftouts." And Esperly added, "Dhaulagiri apparently isn't entirely inactive. They sent *you*."

"I sent myself—to talk to the lichen. There *is* communication?"

Esperly sighed, "As much communication as can exist between physically tiny philosophers with complete mastery of matter/energy laws, and physically huge, trampling, stupid rhinoceri who can't tell a philosopher from a fence post.

"The constant worry of the Mars Patrol," Esperly went on, "is that the philosophers will lose interest—lose patience—and disperse the rhino's breeding place to atoms. The first expeditions that blundered into the lichen were completely erased, you know."

"The history books say they died in the dirt storms."

Esperly widened his eyes and half-smiled. "My dear Bard! When any physical body is dissolved—or aggregated—there is tremendous explosion or implosion within the surrounding environment."

Vardos recalled references to gods speaking out of whirlwinds, but he did not extemporize about them. Esperly was proceeding,

"Even at that early stage in communication—and destruction is a message, after all—the expedition scientists realized that any careless harm to the lichen meant death to the tramplers. As long as Earthmen kept clear of the lichen fingers trailing after the polar snows, the expeditions were left in peace. Later, experiments with radio wavelengths—"

He was interrupted by an insistent alarm code chiming throughout the navigation section. He drew a minimum-sized DM from his uniform pocket, positioned the channel wafer, and said, "Captain Esperly speaking. Over."

He listened, covered the transmitter with his palm, and murmured to the Bard, "The Chief Engineer reports Launch Logistics Cave delivering only

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emergency stores until the parts boycott is over."

Vardos suggested, "Are the boycotters aware that Director Couay is aboard this ship?"

Esperly smiled and readdressed the DM. "Chief, tell Logistics to go straight to the Industrial Council. We've got their Director aboard. They'll probably authorize a special stores replacement. Over and out."

He clicked off the DM and modified, "That is, depending on how important Director Couay is to them."

"In my opinion," said the Bard, after a thoughtful swig of Grape, "it was the Dame Director who instigated their present program and devised the tactics."

"Opinion based on what evidence?"

"Nothing very concrete. Past experience—current observation," mused the Bard. "I'm not good at giving evidence. The words dissolve into metered lines or catch-phrases."

"Such as—?"

"What need has Earth for Mars? Her wealth recedes

In ever-outward waves—the Moon engulfed,

Devoured, done—the Asteroids swept clean.

To Jupiter will Earth now turn her sights—

To Io and eleven fellow moons.

So why must Mars, no longer center-stage,

Endure a thwarted temper's useless rage?"

Esperly smiled, "All right, in a Bard's tongue, *why*?"

"From a tongue far better than my own, *Hell hath no fury like a woman scorned.*"

Esperly's eyes were very round. "A woman *scorned*?"

"Dame Couay had to best considerable competition to arrive at her Directorship. Normally she must be an uncommonly shrewd industrial expert. Why, then, has she embarked on this short-sighted Mars attack, with all the force of brain and bluff? Her cold rage is palpable. Behind it, I scent *malice*."

"Great Saturn! Malice against whom?"

"A false-swearing Mars Patrol Captain?" smiled Vardos.

"Not I!" returned the skipper hastily. At the Bard's laugh he went on, "Nor any Mars Patrolman, given the space-isolation of the Patrol and the social distance between the Service and the industrial experts."

"Well, I'll stake my Laureate on the malice," said the Bard. "In destroying the lichen Dame Couay is destroying someone a great deal closer to her." He paused, "We sloughed her off rather cruelly—and with little consideration for your Lady's time and duties."

"My Lady is accustomed to diverting guests until I'm ready to send for them. Rank has its privileges," said Captain Esperly.

Mealtimes were very informal aboard null-gravity ships, since the food was prepackaged and needed no

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special serving. The smaller children always ate within a residence cubicle, where discarded and forgotten apple cores, cookies, and candy bars could drift harmlessly before being vacuumed into disposal bags. The ship's personnel fetched food packets and ate wherever they chose—with their children, at work consoles, in wardrooms. Personal freedom in minor matters relieved the monotony of uneventful patrolling.

Lift-out being delayed by the uncertainty over the stores boycott, Captain Esperly invited the Bard Laureate and the Dame Director to a meal in the navigators' wardroom. Vardos thought it was like taking a bite of supper backstage before a performance, while watching the stagehands, electricians, and property men go efficiently about their business. The navigation instruments were manned—Communications Chief Esperly took over her console with disciplined competence—only a fanfare and rising curtain were lacking.

During the lift-out, Captain Esperly was on the bridge, and Dame Couay and the Bard were by themselves within the wardroom flare. Despite being clamped to the chair, and having metal plates strapped to his boots, Vardos felt the lightness of null-gravity.

Dame Couay adjusted the suddenly floating folds of her cloak and repinned her elaborate blonde coiffure. Vardos wondered at this fussy primping in an industrial expert. She certainly had not wasted her sharp brain on her appearance during her successful career, where the infighting was notoriously diamond-cut-diamond. Her present preening was more like that of a woman expecting a lover.

Vardos let his mind carry the idea further. Had he been right, after all, in thinking she had some personal connection with the Mars Patrol? Not Captain Esperly—but perhaps one of his officers? Unlikely though it was that the skipper would be unaware of such a remarkable romance—

His speculations were interrupted by Captain Esperly's return to the wardroom. The skipper reclamped himself into his chair and reported, "A bad dirt storm is sweeping Mars at this time. We'll have to stay in orbit—maybe remain in orbit. These storms can last for weeks."

Dame Couay spoke up. "And the so-called intelligent lichen can't control them?"

"The lichen are polar—not much dirt in snow country. Besides, Dame Director, the lichen don't have to control weather just to prove they can do it. Even Earthmen, for example, don't rain-seed clouds just to prove they have the skill."

"Whenever you speak of lichen, Captain Esperly, you speak in metaphor and parallels. Can you say nothing scientifically *exact* about them?"

Again, Vardos admitted she had scored a point. A Bard could accept metaphor—but a scientist ought to be *exact*.

Esperly said at once, "I was about to send for the Biological/Conservation records. We can examine them here."

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"Should you not also send for Dr. Menomer, your current lichen-biologist?"

Captain Esperly seemed surprised, but Vardos reflected that the Dame Director's Industrial Security spies had briefed her on the ship's personnel.

After a pause Esperly said, "Both Doctors Menomer are at a crucial phase of finding within Earth lichen the cells that could be transmuted to accommodate nuclear intelligence. They doubt that such intelligence can be lab-created, but the conditions under which it could have arisen—"

"Since Dr. Menomer—Dr. *Paul* Menomer—is your lichen expert, I would prefer to hear the facts from him."

Vardos bit his lip. Here was the imperious industrialist, whose Board rooms had been strewn with the axed heads of her rivals.

Captain Esperly's pleasant face looked less amiable. "I assure you, you'll hear the facts, Dame Director—but the ship's work cannot be interrupted."

He took out his mini-DM, positioned the wafer and said, "Captain Esperly here, Dr. Joan. May I speak to Dr. Paul? Over."

He listened, and his face became grimly blank. He said, "In that case, Dr. Joan, can you leave the lichen long enough to deliver the report Dr. Paul had intended for the Bard Laureate?"

A flush came and went on Dame Couay's face, leaving it colder than ever. But she nodded calmly when Captain Esperly repocketed the DM and said, "Dr. Paul is not aboard. His wife, Dr. Joan Menomer, will answer your questions personally."

Vardos nearly smiled. Dr. Paul Menomer obviously had gone AWOL. On hearing that Dame Couay had come aboard, he had fought her as recommended by a Pre-Melt Thespian—with his hat. He had grabbed it and run.

Captain Esperly released his chair clamps and, in a single motion, rose up to open the overhead locker once more and activate the belt. This time he drew down a tape projector on a flexible arm.

He grinned, "You see, Bard Laureate, your latest comedy is still intaped!"

He activated a depth-stream of photons into a bright haze beyond the guardrail, and started the tape. Vardos pivoted his chair into viewing position. He felt suddenly transported to a theater seat a comfortable distance from the stage, watching live actors.

Post-Melt Earth demanded richness of language, original wit. The theater was expected to be theatrical—not merely documentary. Still preserved in historical archives were Pre-Melt cinema films rescued from the Glacial Floods. Few of them were considered valid theater—and those few were stage plays faithful to the original scripts.

For several minutes the Bard critically re-viewed his troupe, feeling pleasure at how well they worked

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together. The show was interrupted by the light clank of metal boots on the grid. Captain Esperly, still floating above his chair, killed the screen and the tape. The Bard swung around to look at the newly-arrived crewman.

It was a young woman with a brick-red lab coat over a tan jumpsuit. She was not pretty in the ordinary sense of the word—her face was too long and thin, markedly asymmetrical. She must have been, thought the Bard, a rather unattractive, nervous child.

However, his eye tended to linger on her piquancy—on her thick, beautiful brown hair that glinted auburn as she turned her head—on her clear hazel eyes under thoughtful brows—on the wide, sympathetic curve of her mouth.

Vardos saw a derisive quirk to Dame Couay's smile as she looked at the girl. He reflected that such subtle, asymmetrical beauty would hardly be appreciated by a strikingly blonde rival.

"Dr. Joan Menomer," announced the hovering skipper. He smiled to her. "I'll in-feed the tape. Sit down next to the Bard."

"Thank you, captain."

The girl lobbed a tape-frame to Esperly and clamped into a seat at the table. She explained, "These are immobile study-tapes, captain. May I have the forwarding control?"

Esperly resumed his chair and reached a small cube over to her.

The photon depth-screen again was a bright haze. Dr. Joan said, in a firm but gentle voice, "To begin, a view looking down at the lichen, as if we were standing over them."

The three-dimensional picture was so real that Vardos felt as if he were standing on red dirt, near a hard-caked snowdrift. Between him and the glazed drift were irregular rivulets of tiny, gray-green moss. (*Fingers*, as the scientists called them.)

"The lichen cling to the snows and hence are migratory," continued Dr. Joan. "Shallow-rooted, they seem able to put forward and draw up moisture-absorbing fibers at a speed to keep pace with the seasonal advance and retreat of the ice. There's no biological reason for them to straggle into these divisions instead of proceeding in a mass."

Dame Couay interposed, "Is there any biological reason for them *not* to straggle?"

"Well, it means a transfer of moisture—by interfiber osmosis, we believe—from the units at the moisture-source to those positioned on dry dirt. A more usual phenomenon would be for all possible units to cluster at the source—and for the outer, dry-dirt units to wither. These are individual units, not branches from a common root."

"What are they primarily—algae, or fungi?"

"Dame Director, no expedition has survived an attempt to dig them up. We can only observe and deduce. Here's an enlargement."

In successive jumps the moss seemed to come nearer. Vardos saw it was, as Dr. Joan had said, a close posi-

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tioning of crinkle-edged, velvet-soft little spears. At the tops of the crinkles seemed to be blobs making the gray contrasts to the green shoots.

"Sometimes the fingers become solid circles," said Dr. Joan, forwarding to another close-up view.

Vardos took one look and laughed aloud. "Capacity house—standing room only! Lucky Thespians!"

Dame Couay cried out, "Are you mad, Bard Laureate? I see only a highly-magnified clump of moss on wet dirt."

Vardos sobered down but shook his head. "If all ears in that crowd aren't cocked at a declaiming spellbinder—!"

Dr. Joan smiled, "We call this view *Town Meeting*—but perhaps you're right, Bard Laureate. Now, see what happens when we beam radio waves at them."

A methodical series of views showed the lichen-fingers scattering into what might have been spectrum lines—or wavelength ratios—or mathematical codes.

"The correlation is 100%," said Dr. Joan. "That is, a particular wavelength always calls forth the same configuration—but we can't seem to crack the language. It's not computer math—or abacus math. It's like sending 2, 4, 9—and getting back II, IV, IX. Informative, but no *use*."

"The patterns could be chemical or electromagnetic reaction," said Dame Couay.

"Tell us *how*, and we'll be grateful, Dame Director. Specific radiations might cause the lichen to grow faster or slower—or to be seared and die. Radiation can't possibly cause algae/fungi to make intricate formations."

"But all this is just *reaction*. The lichen don't *initiate* communication!"

Dr. Joan hesitated. "They may have initiated a great deal that has gone completely past our understanding, and have now been reduced to simple visual signs. There are, for example, patterns relating to the Patrol ship's leaving Mars Sector and returning to it. As soon as Captain Esperly decides to dock us on the Moon, our Mars tele-observers record a pattern-repetition throughout the lichen colony. Upon our return, the other pattern is noted. Can this be anything except *Good-bye for now* and *Hello, again*?

"The significant fact is that the *Good-bye* comes as soon as Captain Esperly beams the decision to the Mars office, *before the Patrol ship has altered course*. The lichen obviously know what's happening aboard—they're tapping our communication beams, if not our brain waves."

She went on quickly, forestalling comment from Dame Couay, "What would *we* do, if another life form started sending radio beams at us—especially if the beam was beyond our usual range? We'd focus as well as we could and try to answer. If the life form was actually *looking* at us, we'd motion—or gesture—or signal, 'Okay, reading you on 27 Megahertz—what's the message?' If no intelligible message came, we'd just cut into all their

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beams and listen, realizing they were too stupid to understand the problem."

"Well, what *is* the problem?" pursued Dame Couay. "Why don't the lichen reply on the same wavelength?"

"Even for Earthmen, detectable energy is not the same as workable energy. We detect and analyze various subatomic emissions we can't use. Apparently Earthmen and lichen transmit along different spectra.

"Only very little acquaintance with Mars lichen convinces most scientists that the lichen operate on frequencies beyond the electromagnetic frequencies which—in the course of two centuries—are observed to be present in a child's more sensitive, less electromagnetism-jaded brain. As a child, when I was taken to Mars and set down before the lichen, I was immediately convinced they were living playmates. Even isolated in my spacesuit, I received a feeling of warmth, interest, well-wishing. Throughout my childhood on the Patrol ship, I had a daily routine of prattling to the lichen, imagining myself in their midst, recognizing and naming friends."

"Nonsense!" snorted the Dame Director. "Childhood fantasy!"

"Childhood *sensitivity* is more than fantasy. All the children presently aboard have their lichen friends, and when they're taken to the colony, they stand rapt—seemingly inert—but come away bubbling with ideas and conversation.

"Thus, children are the real communicators, and a percentage of us born and raised in the Mars Patrol never lose this extraspectrum thread. Maintaining a family ship—"

"Is a criminal waste of public funds—of industrial resources!" raged Dame Couay. "And I must say, *Dame* Menomer, a waste of scientific brains!"

The furious woman unclamped her chair, pushed herself from the table, grasped at the guardrail and dove, with a confusion of floating cloak folds, away from the wardroom, maneuvering past the flyovers and disappearing within the midship section.

There was a silence around the table, but Vardos saw that young Dr. Joan was taut with the effort to repress tears. Captain Esperly asked the Bard, "Do you wish to view the rest of the report?"

"No need. I'm convinced," smiled the Bard. "Those configurations were by intelligent creatures, without a doubt."

"Thank you, Dr. Joan, you may go," said Esperly in a kindly tone.

The young biologist thanked him and bounded away over the steel girders. Vardos thought she had not bounded far, before she had burst into tears.

Captain Esperly seemed distrait. Vardos realized the skipper had one or two things to mull over, so he took his leave.

Vardos negotiated his way aft, to the gymnasium. He could not endure space idleness. On the Proxima Cir-

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cuit—on those six-month hauls from Waystation to Waystation—he spent his free time training his superbly athletic body. He now determined to wait out the Mars storm by exercising in the Patrol ship gym.

However, when he arrived there, he discovered the padded grid caged over by a geodesic netting within which the smaller children tumbled happily in weightlessness, without the danger of drifting from the living quarters.

One of the teenage girls he had noticed before was minding the toddlers from a higher perch, a sash anchoring her loosely to a girder. She was hand-viewing what probably was a school tape, thought the Bard, since she raised her head eagerly as he drifted past. She ventured, "Hi!"

Vardos hooked a toe over the girder, pulled himself back, and swung a half-turn underneath the girder, coming up to straddle the beam. "A space acrobat?" smiled the girl. "You surely have set us in a tizzy! The Martian storm-brooms are going like windmills, and Joanie has rushed keening to the skipper's wife."

"Must I take the blame, sweet Maid?"

"You brought the Dame Destroyer aboard."

"Dame Destroyer?"

"Yes." The girl's face suddenly was still. Her unblinking eyes looked inward. "The tiny green folk want to know—"

She paused, listening. Vardos realized she had gone into a mediumlike trance. He waited. She resumed dreamily, "—want to know if they are to eat her up. She is stopping the starships, you know. Dhaulagiri canceled, this Earth day, because reserve parts were denied them, on Earth and on Vesta—"

The lichen were monitoring all channels, thought the Bard, but they could *transmit* only on the supramatter wavelengths still undeadened in children.

"—and you will never persuade her because her mind is burnt out by revenge. Do you want the tiny folk to eat her up?"

"I'd like to visit the tiny folk, if they'll stop sweeping dirt in my face."

"Very well. You accept responsibility. The decision is yours, not ours. We untrance the child. Look to her."

The girl's eyes rolled back. She could not crumple, in weightlessness, but her head wavered. Vardos reached a steadying hand to her cheek and caught the viewer drifting from her limp fingers.

In a moment she was awake, and blushed from embarrassment. "Why, I blacked out! And we were only hours in Moon gravity! Can I ever hope to study on Earth?"

She snatched the viewer and seemed miserable. Vardos smiled, "A few days of feeling heavy as lead—a few crying jags—and you'll carry your Earth heritage with ease. Will you return to work with the Patrol, like Dr. Joan Menomer?"

The girl looked doubtful. "I don't

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believe so. Lately, when I think of the lichen, I get so tired!"

Apparently she was not one of the percentage who could keep the supra-matter wavelengths from being jammed by the electromagnetic spectrum. She would stay on Earth and forget the tiny green folk.

Vardos pushed and glided to his ship cubicle. As he landed on the catwalk he noticed Dame Couay emerging from her cubicle a few yards away. Not especially desiring to converse with her, he slipped quickly through the opening doorway. He had drama transcripts in his flight bag, but before he had decided how he would apply his mind, Captain Esperly DM'd to invite him to the bridge. The Mars storm was fading away. A landing capsule could descend.

Vardos once more negotiated the length of the ship, overtaking Anita Esperly, who, as Communications Chief, had to be at her console during crucial maneuvers, although her junior officers otherwise shared the watch.

What had taken place between Anita and the "keening" Dr. Joan? The biologist must have been worried sick about her AWOL husband. Vardos knew it was improper for him to pry, but he was curious, nonetheless.

Dame Couay was already at an observation viewpoint, and Vardos joined her. He debated whether or not he ought to let the lichen eat her up, and concluded the answer depended on her own attitude.

As he joined her she nodded and said, in a low, sarcastic voice, "You still imagine the lichen to be intelligent?"

He looked at the storm-blurred red-dust atmosphere hanging in space. "The lichen never should have become the Mars issue. Look at the storm-torn planet, Dame Director! Can you, an industrial expert, imagine building on it—or inside it? Can't you foresee the weeks, months, of such storms during which nothing could be freighted in or out!"

Her blue eyes burned. "I take one step at a time. The first step is to destroy the lichen."

Vardos murmured, "Or to destroy Dr. Paul Menomer?"

She tried to keep her voice low, but it trembled. "I want to destroy the rotten graft that took him from me. It was I—myself—who encouraged Paul to study lichen. I had met him on the Moon—and, frankly, wanted to keep him there. He was an eminent biologist. I induced the Industrial Council to hire him to study the Mars lichen.

"It was high time, anyhow, that the two-centuries-old dispute was settled. I expected Paul to settle it quickly—and to stay with me. I knew he was attracted to me, but he had an uneasy awe of my rank, a reluctance to presume on my time and emotions."

She paused and glanced around. The bridge officers were intent on the Mars approach. The observation viewport was out of their attention area. She continued.

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"Paul naturally had to apply to work with the Mars Patrol—but, as you have seen, the Patrol is a *family* organization. The Moon Patrol Office has a waiting list of Mars relatives who want jobs here. Even with a space-rotation schedule, the Patrol is a closed corporation.

"Paul did not need to tell me how difficult the problem was. Everybody knew Anita Esperly had married into her job as Communications Chief—marriage or family connection was the only way."

What a cat you are, thought Vardos.

"However, at that time the current lichen biologist was retiring, and I urged Paul to demand the job on merit. I knew—our Security agents had told me—that a ship-child, as usual, was in line for it. She was young, and I felt the Patrol Office could be talked into sending Paul aboard as a temporary adviser.

"Since the ultimate decision would be the girl's, once she had the authority, Paul naturally visited her on the Moon, while she waited for the rotation schedule to be completed. He became fascinated by the description of the lichen—told me he wanted to make it his life work!"

"I saw that the situation was getting out of hand. The Council had hired Paul to dispose of the lichen, not to make it his life work! And then—and then—I received such a letter—! He must have been mad! He had married the girl and gone permanently with the Patrol—!"

"To study lichen?" murmured Vardos.

"What else? You've seen Dr. Joan Menomer, Bard Laureate! An awkward, ugly, long-faced little mouse! Why would any man marry her—except to further a career that could not be furthered except by marriage?"

The Bard refrained from saying he had found Joan Menomer an unusually attractive and sympathetic girl. The hard, aging, blonde beauty beside him continued.

"I resolved, from that moment, to destroy the lichen *and* the Patrol. The UMN had been inactive too long. We needed a lever—Dyke Ter Hetz—and force behind it—the boycott. Storms or not, Mars has to be brought under Earth mastery. Lichen? Nonsense! Let *me* crush the lichen!"

"You would be wiser to stay aboard this ship and let me inspect the lichen alone."

"And come back with a Bard-tale of elves and leprechauns? No, indeed! The report to be given will be *my* report—an *expert* report—and the Industrial Council will accept it. There will be *no more starships*, Bard Laureate, until the Mars Patrol is destroyed!"

And Joan and Paul Menomer with it, thought the Bard.

Even by robot carrier, parts-replacement help from Proxima was 4.75 years away. Maintenance of Earth ships had to resume—and the Dame Director was the roadblock.

For all Vardos cared, the tiny green

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folk could eat her up.

The Mars decontamination suits were lighter and more comfortable than the suits used in Outer Space. They provided air and warmth, but with no need for protection against absolute zero.

Vardos and Dame Couay suited up and joined their escorting crewman inside the landing capsule. When all systems were Go, the bay lock was sealed, the ship's bulkhead was raised outward, and the capsule popped free.

The crewman remarked, "Did you see the televiewer transmission, Bard Laureate? The lichen fingers have looped into daisy chains—welcome chains, we call them. Uncanny, the way the lichen know what we're about to do."

Dame Couay began, "Random migrating patterns—," but Vardos overrode her with a question to the crewman. "Has there ever been a theory about the finger pattern? What are they reaching for?"

"Maybe the lines are an antennae/step-down process. Mars doesn't have Earth's strong magnetic field, but cosmic lines of force could—"

"*What* lines of force?" demanded Dame Couay. "Has anybody found evidence that they exist?"

The crewman said steadily, "It's a matter of knowing where and how to look, Dame Director. The Earth was mighty old before scientists 'found' electromagnetic waves that had been there all the time."

The Dame Director had no rebuttal. Vardos reflected on the impossibility of proving a negative. Any number of unknown forces could exist in cosmic infinitude.

The capsule dropped to a base sheltered by a rocky outcrop several kilometers from the polar cap. The recent storm had swirled dirt atop the adit, but an electronic signal from the capsule caused a humping and heaving until a pair of horizontal gates leafed upward and folded back, plowing the dirt to the sides of the vertical shaft.

The capsule lowered itself into the subterrain hangar and stopped. The crewman grinned, "You and the Dame Director are on your own, Bard Laureate. Because of the uncertainty of lichen reaction to strangers, the Patrol is under orders not to risk us crewmen on these visiting-fireman routines."

The Bard smiled, "Does the same order apply when you bring the children here?"

"Lord, no!" laughed the crewman. "The kids are something else." He activated the capsule hatch. "But Esperly has ordered me to stay in the hangar while you're on the surface. Directly forward of the capsule are the lift-gates and the Mars buggy, Bard Laureate—the standard Sol/Proxima terrain vehicle. Remember, as soon as you key the engine, the old black box starts recording, just in case."

Vardos assisted the Dame Director from the capsule, escorted her through the gates and into the buggy. At a signal from Vardos, a capsule-

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control activated the lift. They rose to the surface. Vardos keyed the engine and drove from the lift onto Martian soil.

A mound of drifted dirt slowed the vehicle, but the high, deep-tread tires chewed through it, and they were on their way.

For the first kilometer toward the thin white glow on the horizon, neither spoke. Vardos wondered if the Dame was self-conscious about the recording box, but her first words showed that she was merely preoccupied with technical problems.

"The capsule hangar is an example of how Mars could be habitable, workable."

"But not approachable," Vardos retorted. "Little though I know about Mars, I'm aware that storms can isolate the planet for months at a time. Industry needs regular transport facilities. A long storm would have the same paralyzing effect as a long strike."

"Systematic stockpiling could solve that problem."

"During the crucial building phase, stockpiling would be impossible—or at any rate, too expensive. Earth now has to compete with four Proximan planets, and wholesalers are quite willing to wait 4.75 years for cheaper goods that sell like hotcakes when they arrive. Angelan textiles, Beatan honey, Claudian tree-synthetics, Delian perma-paints—"

"Earth research can, and has, cut into Proximan imports, simply because Earth is given the grace period of 4.75 years between shipment and arrival."

"To some extent—thanks to tachyon-Morse communication—Earth can anticipate the cargoes and catch up. But how competitive will you be when your main industrial planet is storm-isolated for incalculable months each year?"

She did not answer. They continued over the desolate, rugged, monotonously reddish ground until they saw a gray-green carpet looping and massing beside a low glacier. It was a strangely affecting sight—life ingeniously clinging to a last trace of the moisture it could not live without. How had the lichen evolved? A billion years of intellect/science could accomplish marvelous things.

Vardos stopped the buggy. "I appeal to you once more, Dame Director. Let these creatures live in peace, whatever they are."

"Why? They contribute nothing to the Sol/Proxima gross product. If there once was an intelligent race on this planet, it has sensibly dispersed to other star systems."

Vardos thought a moment. "Yes, probably some of the Martians went elsewhere in the galaxy, but some of them must have loved their planet so much that they chose to mutate—to live and die at home."

"Strange sentiments from a restless star wanderer like yourself."

"I hope I have the compassion to understand sentiments different from my own. Or, rather, I hope *you* have the compassion, Dame Director."

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Her face contorted. "Paul humiliated me—for a fraud—for supposedly intelligent Martians that *do not exist!*"

Vardos sighed. They climbed down from the buggy and approached the lichen on foot. It was amazing how real, how distinct, each green-gowned, gray-ruffled moss tuft appeared, headblob turned toward him.

He paused as a happy, warm feeling washed over him. The decontamination suit was no barrier. The welcoming joy—the familiar recognition—the babble of tiny voices—needed no radio channel.

Standing there, looking down at them, Vardos thought, *this is exactly the view the UFO had, of the crowd in the amphitheater.*

His mind rocked with a spontaneous burst of triumphant laughter. They had known he would identify the UFO as their molecular-inswept waldo. It was the best joke they had played in centuries.

With a sudden comic impulse of his own, Vardos clenched his fist at them and quoted, *"Since history's molten dawn—"*

They whooped with increased hilarity. How funny he had looked, poor Earthman, shaking a fist at a mock-up saucer—at a configuration of Earth molecules—at a waldo drawing its energy from the humans it was fooling. The laughter was infectious, and Vardos laughed with them.

He had forgotten he was not alone—until Dame Couay caught at his sleeve. "Bard Laureate! Are you out of your mind? What are you laughing at?"

He stared at her. Could she be so deaf? So stupid? He gestured to the lichen, "Can't you hear? Can't you *feel*? These Martians are delightful—on another intelligence plane—"

She shrieked, "You're making fun of me! You and Esperly are laughing behind my back, because Paul ran away from me! You think I'm a joke! You know damned well intelligent lichen doesn't exist! I tell you, *it doesn't exist!*"

Before he could come out of his happy trance and grab her, she had run to the lichen. She stamped her boot into a cluster of them. "*It doesn't exist!*"

A tremendous blow—yet one that he somehow did not feel—swept Vardos's feet from under him, spun him into the air and suspended him, face down, over the lichen. It was not a wind, thought Vardos. He would be feeling a wind.

A split-second later he wondered what he would be feeling *with*. His body was gone. Only his mind hung there. He thought, "I'm the eye in the center of the hurricane."

Below him, Dame Couay was fading out like a ghost. Her luminous mist became a small whirlwind that seemed vacuumed into the print of her boot. The crushed lichen became more wetly green. They slowly raised their pressed-down bodies, expanded their crinkled edges, turned their headblobs this way and that. The outline of the bootprint disappeared.

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Vardos realized that the lichen did not destroy their attackers from senseless revenge, but from the necessity for a quick transfusion of moisture and animal molecules to the injured algae/fungi.

He looked anxiously at the recuperating individuals. Could they survive with the added life force from only one human body? They had every right to eat him up, too, since he carelessly had brought Dame Couay to them.

Reassurance—pity—an echo of the previous laughter—made his mind strangely at ease. Around him was a cloud of sharp red sand.

Sharp. He was feeling again—shutting his smarting eyes—feeling his decontamination suit ripping away—shivering with sudden polar chill. He was falling—with something that fell with him, half-pinning him in smothering sand—

He struggled. An oxygen mask cupped his face, and a voice said, "*Take it easy—your shoulder is under* the buggy—don't thrash out of the thermo-bag."

The capsule crewman had found him. He heard radio-distorted wheezes of exertion as space-gloved hands pulled him free and stuffed him to his chin in warming fabric. The oxygen mask had fallen aside. The thin, sunlit air was cold enough to make his throat ache, but it was not fatal to his lungs.

"Okay! I can navigate under my own power," he gasped in a breath-cloud.

The crewman helped him sit up and lean against a wheel of the wrecked buggy. Immediately before him was the adit to the capsule hangar. He muttered, "The lichen dumped me here!"

"Yeah, you and the buggy, with a damned hard thud," came tinnily from the suit transmitter disk. "Lucky you got steel muscles. Can you maneuver in that damned bag until your back is to the lift?"

Vardos, feeling like the loser of a sack race, shifted away from the buggy. The crewman grasped his shoulders and dragged him backwards, onto the lift plate. "I'm sending you down. See you later."

The lift descended. Vardos hobbled to the capsule and thankfully scrambled into the warmer atmosphere.

He was sore all over and dizzy from the temperature bite. He closed his eyes and was only vaguely aware when the crewman finally joined him.

"We're you looking for Dame Couay?" asked Vardos. "The confounded troublemaker is gone—reduced to atoms."

Yet, even as he spoke so callously, he was sorry that a capable woman had lost her self-discipline and good judgment.

"Yeah, we figured the lichen would eat her," said the crewman. "You'd think people would learn, after two centuries, wouldn't you?"

Vardos was reminded of the Industrial Council, the UMN, and the starships. He had to pull himself together and finish his assignment—the imme-

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diate removal of the boycott.

Vardos heard Captain Esperly speak to the capsule as it blasted off the red planet and headed for the orbital rendezvous. He still felt too jolted to take much interest, until the crewman asked, "Bard Laureate, do you want to see the medics before you report to the bridge?"

At the word report the Bard's subconsciousness kicked him awake. He remembered Dame Couay saying *my report*. Undoubtedly the Industrial Council ought to receive what they could believe was their Director's report.

"Medics, no. But I'd like time to hot-mist my aches and change my clothes, with the skipper's permission."

The crewman relayed this message and received Esperly's okay. Vardos hoped he could take advantage of it. He felt as if all his senses had been jarred loose.

The rendezvous went smoothly. The capsule slid into its bay, the bulkhead closed, air flooded the lock, and Vardos climbed stiffly from the capsule. When he floated from the lock, he saw that a medic was waiting. Vardos waved him aside with a grin and spidered along the flyovers to the residence catwalk.

He was in luck. Only the children were present, far below, in the play area. He bounded past his own door and entered the cubicle from which he had seen Dame Couay emerge.

He would have to work fast. Esperly might already have ordered the Dame Director's cases sealed, for delivery to her executors. The chief officer probably was busy with finishing off the rendezvous/docking details—he would assume there was no hurry about the cases. It was not as if the woman had died because of a crime aboard.

Her cases were stacked inside a net which held them to the bulkhead, at the foot of the bunk. A small business case was on top of the pile. Vardos extracted it from the net and opened it.

As he had expected, a DictaCorder was among the papers. He activated the tape and heard Dame Couay's businesslike voice, " . . . to the Vesta subsidiary—and check the steel production figures, Gina—"

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He skipped through the tape, his ear sampling the letters and reports. Would his long-unused skill as a mimic be equal to the voice forgery? After the last letter Dame Couay had taped, he began dictating, "Gina, this is the first part of the lichen report. I'm still on the ship but want to organize my ideas."

He paused, played it back. He had pitched his voice too high, and not hard or world-weary enough. He erased and tried again. Still not perfect, and time running out. He took a chance on the third attempt and taped the complete statement.

Not daring to stay and play it back, he hurriedly replaced the DictaCorder and the case, plunged to the door, opened it—and cursed. The purposeful clang of boots was approaching along the catwalk.

Misdirection was his only chance. He sprang back to the net, jerked out the case—and was, he hoped, caught redhanded as he pushed the case down on the bunk and opened the lid.

A pokerfaced officer, a roll of sealing tape over his wrist, hovered in the doorway. In an ironic tone he commented, "Dhaulagiri Security getting jump on the Mars Patrol, I see."

Vardos turned from the case and grinned, "I assumed we were on the same team, and I didn't know if Esperly intended to monitor the Dame's tapes. They ought to be monitored, you know. We've got to find what orders she may have given, about the boycott."

The officer swung into the cubicle. He picked up the DictaCorder. "You listened?"

"I woke up too late—the damned storm left my brain full of sand."

The officer hesitated, rewound the tape a few digits and played it back. ". . . a Mars factor we overlooked —the storms . . ."

He clicked off the tape. "Okay, this goes to Esperly. From then on, it's between Esperly and Dhaulagiri."

"You mean, my presence here is not wanted?"

"As a Starship Guardian, you're out of your bailiwick. Go soak your head—looks like you need it."

"Alas for glory that on place depends!

Archangel *there*—but *here*, poor devil without friends."

The officer laughed, and Vardos drifted out of the doorway and into his own cubicle. He took his time about hot-misting and changing. He wanted the DictaCorder to reach the skipper before he reported to the bridge.

When, refreshed and reclad, he circus-vaulted into the navigation section, he saw that his timing had been wrong. The skipper was clamped at the wardroom table, a Multicorder extender-lowered from the overhead locker—but Anita Esperly was also converging on him, from the bridge grid.

Vardos braked his double-sault arrival at the guardrail, but Captain Esperly motioned him to continue to the table. "One moment, Bard," he smiled. He nodded at Anita. "The others from Moon Traffic Control?"

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She said crisply, "They're computing an orbit that will allow the landing capsule to descend in a free plane and off-load the Bard at a Fracastorius slag adit."

"Excellent. When you have the data, try to locate Dr. Paul—at their Moon residence, perhaps—and tell him to board at Fracastorius."

She seemed to set her magnetized boots more firmly on the grid. "Will you discipline Paul for being absent without leave?"

"I can't erase the log tapes—as you very well know, my dear."

Her dimpled chin lifted in a determined manner. "Then I'll have to own up to—to giving him your permission. It was an emergency decision—I felt as if I held a grenade in my hands—"

Vardos once more made a motion to leave, but the skipper gestured him to a chair. Vardos clamped down, and Esperly said to Anita, "Well?"

She recited swiftly, "On my way to the bridge for the Moon lift-out, I bumped into Paul. He had just spied Dame Couay—nobody had told him she was aboard—"

"Spied from where?"

Her nicely tan face paled. The dusting of freckles across her pert nose was abruptly darker. "From—from the lichen lab. He had just come out and was standing within the vine tangle—you know how thick a screen the Proximan bells make—"

The skipper said nothing. She took a breath and went on, "Paul had to get away—but he saw that Dame Couay was heading for the bridge, so he couldn't talk to you there—even over the DM, since you might have mentioned his name.

"He was looking for Joan, but I realized there was no time to lose. I told him to wait in the lab while I got you aside and explained. He went inside the lab, but I just hung around a couple minutes and entered the lab and told him you had said he could leave ship. He *ran*—and I came to the bridge. You and the guests were eating lunch—"

Vardos put his hand across his mouth to hide a smile. Not *again*! And honest Anita was a very poor liar.

Esperly was saying gravely, "I don't know which I'd consider the greater offense—going AWOL, or assuming I'd give such permission via my wife."

"Going AWOL is a disciplinary offense. Believing *me* is just poor judgment. I realized you might reprimand me," she added, "but it was the only alternative to an emotional explosion."

Esperly said nothing. Probably, thought Vardos, he was remembering Dame Couay's spiteful hysteria against Joan Menomer.

Anita continued in a pleading tone, "Paul was blameless! He had met Dame Couay at a social gathering. When she later hired him for the Industrial Council, he thought only of the interesting lichen assignment. When the Dame started getting coy, he was appalled and sought to resign without hurting her feelings.

"In the course of perfunctory inqui-

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ries about the Mars Patrol, he met Joan—and fell slapdash in love. And, trying to be gallant to Dame Couay, he told her he was joining the Patrol because of the research.

"As headstrong and beautiful as Dame Couay was, she could never accept that Paul would think someone else attractive. Thwarted and furious, she took out her revenge on the Mars Patrol and the lichen.

"Paul never could have hidden from her if he had remained aboard. She would have clawed his eyes out—or made terrible scenes—"

Esperly halted her with a gesture. "I'll take all this under advisement. Just get Paul to Fracastorius on time."

She dived back onto the control bridge. Esperly shook his head. "Why do wives think they can get away with such nonsense?"

"Because they get away with it," chuckled Vardos.

"Did you see her stick out her chin and stare me down? She *will* try to cover up for the children, but she never before has interfered in a disciplinary matter. What could have fired her up?"

"Well, Dr. Joan Menomer went to consult her—keening, according to one witness."

"If you ask me, Paul bolted like a scared rabbit—and he won't try to hide behind Anita's well-meaning lies. And now, Bard Laureate, what am I to do about *your* fine, Machiavellian touches?"

"Captain, sir?"

"First, the tape you didn't listen to." Esperly clicked a switch on the MultiCorder. A hard, weary, contralto voice cut in,

" . . . still on the ship but want to organize my ideas. In concentrating on the lichen while being forbidden to experience Mars, we've been working with only half the picture. There's a Mars factor we overlooked—the storms.

"If we go back two centuries, I'm sure we'll find that our ancestors were defeated, not by the lichen, but by the storms. The lichen were a prettier legend, that's all.

"I don't blame us for overlooking the storm factor—for thinking our technology could conquer what defeated our ancestors. We had never observed or experienced a Mars storm. However, I've just been watching the red chaos through the viewport—watching and mentally running through cost sheets.

"It's the costs we have to consider, with increasing Proximan competition. We could rebase on Ganymede or Callisto for much less than the Mars development would set us back.

"I still believe the so-called lichen are an excuse for the fraudulent sinecure of the Mars Patrol—but that's no concern of the Industrial Council. We can relegate the lichen to legend and face the fact our ancestors had to face—that coping with the incredible storm-violence on Mars is not worth the investment."

Esperly shut off the tape. Vardos commented, "A well-reasoned argu-

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ment. Don't you agree?"

"So I did—until I heard this."

Esperly pressed a second switch. Vardos heard his own voice saying, ". . . storms can isolate the planet for long months at a time. Industry needs regular transport facilities . . . "

Their conversation in the Mars buggy! But the buggy lay wrecked—! He exclaimed aloud, "The black box! *That* was what took the crewman so much time—detaching the black box!"

"Yes. And I was thoroughly baffled to hear you persuading Dame Couay to facts she had already recorded before leaving the ship. Your mimicry is astounding, Bard Laureate—but it *is* forgery."

"Of course. I can't deny what a voiceprint would inevitably reveal."

"And you can't expect me to let a forgery stand!"

"Not for the starships," said Vardos quickly, "although the tape is the best way to get the Industrial Council to rescind the boycott—their own Director talking hardheaded profit-and-loss. But Dhaulagiri can apply other pressures, once I assure them the lichen are a valid research area.

"But for Dame Couay herself, captain, I wish you would let the forgery stand. More or less deliberately, I took her where I knew she was likely to be killed. I can't bring her back to life, but I can reestablish her reputation. Falling in love at a critical period in a woman's life—being thwarted after a career of unending success—she went out of her mind over Paul Menomer and used her power and influence in foolish revenge.

"Forged though it may be, that final tape is far more the real Dame Couay—and will be far more respected by her colleagues—than anything else she's taped during these past love-sickened months."

The skipper slowly reached to the MultiCorder. Vardos held his breath. Which tape would he erase?

Esperly's blunt finger came down on the second groove. The black-box recording was erased clean. As he replayed the now-blank tape, Esperly commented, "Scrubbing due to technical error."

"Thank you, Captain Esperly," said the Bard.

The landing capsule deposited Vardos on schedule at the Fracastorius adit. As he stepped from the airlock he saw a studious-looking, civilian-clad man waiting among the Patrol officers. The man had a broad forehead and a peculiarly unlined and innocent face. The type of researcher thought Vardos, who is in such an abstraction of intellectual activity that he hardly notices what is happening around him. If this was Paul Menomer, it was no wonder he had been so clumsy at turning off the high-powered Dame Couay!

Vardos ambled up to him, shook his hand and said, "Dr. Menomer? Don't worry—the girls have softened up the Old Man."

"Bard Laureate! Such terrible, unbelievable turmoil—!"

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Vardos patted his shoulder and resumed his gliding course toward the Transport tunnels.

He was only mildly surprised, on emerging at the Shuttle Departure ramp, to find Dyke Ter Hetz and a media party waiting for him. Ter Hetz had a better spy network than Dhaulagiri and the Industrial Council together.

The media party rushed the Bard. He held up his hand and said, "First, I wish to correct a half-statement Mr. Ter Hetz snatched from me a few days ago. Quote, In my limited personal experience at that time, I had not encountered sapient extraterrestrials. However, I have since been to Mars and encountered the lichen. They *are* sapient—and I'll do my utmost to protect them, End Quote. I have no comment on any other phase of my Mars visit."

Ter Hetz opened his mouth-slit, but the Bard repeated a *No Comment* that made him reconsider.

Another of the group piped up, "Your understudy has been getting rave reviews and star offers. Gonna hold him to his contract, or let him go?"

Vardos smiled, "I naturally don't want to lose exceptional talent, but I'm glad the young chap is doing well, and I wouldn't stand in the way of a star offer. And now, gentlemen, the shuttle is loading—"

He strode forward, and they gave way, Ter Hetz with a shrug, as much as to say, *no muck to be raked there, anyhow.*

Vardos arrived at the amphitheater during the last act of the troupe's final performance. He watched briefly from the back of the house, approving his understudy's technique but guessing the man would not do so well without expert direction.

Backstage, there was already quiet movement toward getting the troupe on the road to the next rotunda. Vardos opened his dressing room door—and found his manager contemplating an overflow of mail bags stowed on the available floor space. He asked in surprise, "What's all this?"

"Guess," scowled George Apfelstein.

Vardos picked up the nearest letter and unfolded it: "Honorable Bard, Although your inspiring productions leave no doubt of your ethical integrity, it would have been well if, in your *ex tempore* remarks, you had made a clear division between mythology and revealed religion. The temptation, to carpers, of including Ezekiel . . . "

"Thespis save me!" muttered the Bard. He unfolded another missive: "Thespian Vayan, We Neo-Druids and Philo-Olympians are accustomed to your self-serving obedience to the Establishment, but you go too far when you attack Apollo, since Ezekiel can come under equal doubt when . . . "

"George! What the Homer can I do?" cried the Bard.

"Don't ask *me*. I *told* you not to extemporize," said George Apfelstein. ■

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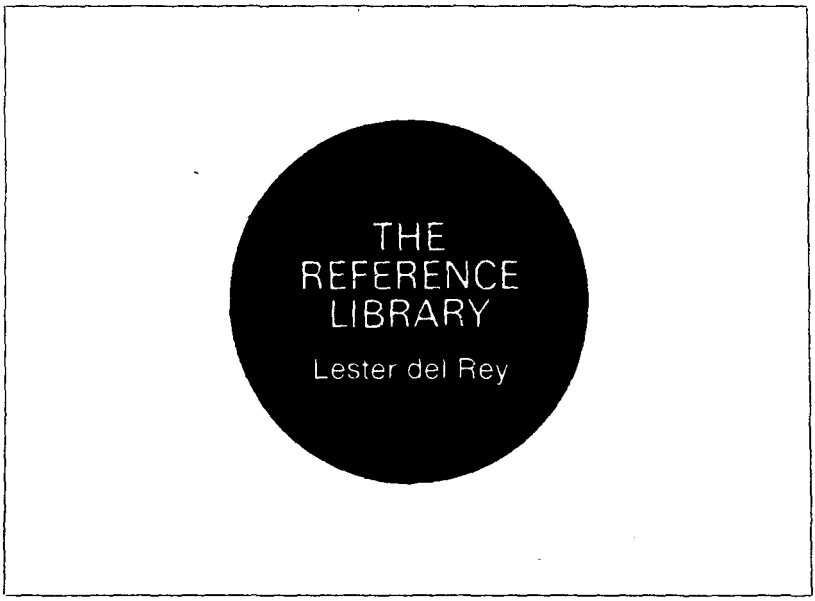

GOOD AND BAD:
Recently I tried to make a list of all the ways in which a novel could fail. Some of them are obvious. The characters may be wooden, there may be no central problem or theme, or the supposed problem may be something that could be easily solved by a little common sense—of which none is shown. The writing may be bad, or totally unsuited for the story. Glaring inconsistencies may creep in. The ending may be unsatisfactory—either no solution is provided or one is contrived by coincidence, outside help, or something the protagonist knows or can do that was not previously revealed. These are just a few things that can go wrong. I had over fifty ways listed before I gave up, with no end in sight. It's small wonder that so many bad books are written.

To complicate things, the demands of a good book include many requirements that really cannot be taught—though in some cases, they can be learned by practice and self-criticism. There are rules for creating characters, but they really aren't of much use. To give a character life is an art, and one which no amount of mere description will imitate properly. And to give a feeling of aliveness to prose may be an even greater art; certainly it has little to do with vocabulary, grammar, or formal rhetoric—though adherence to the rules used by well-educated users of the language is a basic. But good writing in fiction requires the ability to convey feeling from writer to reader by cold type—and that can't even be defined, let alone taught. The wonder is that good books do get written—even in science fiction, which

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demands more from the writer than do most categories.

Perhaps the most surprising fact, however, is that a great many intelligent people in publishing and in the visual media never seem to have gained any ability to tell good from bad—may even extol and prefer the bad. The evidence that such is the case appears before us almost daily.

An example of how bad a published book can be is a paperback book entitled **BATTLESTAR GALACTICA**, credited to Glen A. Larson and Robert Thurston (Berkley Books, 244 pp.). I have an advance reading copy, without a price; obviously, someone thought the book was good enough to garner some interest before publication officially; it should have been carefully hidden, in my opinion.

This is, of course, one of those bastard products known as "novelizations." That simply means that the book was written from the script for "The New Space War Epic from Universal: an ABC-TV 3-hour spectacular this September . . . a Sensational Hit Series This Fall!" I would guess that Larson wrote the script and Thurston "novelized" the book from that. Hence, while the writing is at a very low level, Thurston cannot be wholly blamed for it.

Yet some blame must attach to anyone signing his name to what purports to be science fiction in which the basic laws of Sir Isaac Newton are wantonly disregarded. By this time, every reader of science fiction should know that there is no air in space to act on rudders and permit fast turns. In space, without the restraint of pressure effects or friction, a body in motion will maintain both direction and velocity of motion unless acted upon by an outside force. As Newton said, long ago. Yet here, during maneuvers outside the atmosphere of any planet, we have a dogfight between opposing forces, in which "all went into an abrupt, arcing turn and headed away." No need to kill velocity or produce a vector of direction by the use of a great deal of power. They just swing around and go away. There are a *lot more cases like that.*

The characterization is at a level that would shame the crudest comic writing. All the leaders are stupid. The head of the whole human system of worlds is taken in by a plot that shouldn't fool a naive child. Men have been waging all-out war with some horrible aliens for generations. Then one man tells the glorious leader that the aliens want to declare peace. Does he check up to find what the aliens are doing? Does he pay any attention when his military commander tells him the aliens are attacking? Nope.

The commander, Adama, is hardly any better. He brings his ship down to a world under attack. There he takes a ferry ship and goes off looking for his wife, leaving his troops. Great leader. And nobody even suggests that he's unfit for his job.

The plot? Well, yes, I think there is supposed to be one. Our commander escapes from the destruction visited on the rest of the fleet and decides the only safety for the remnants of humanity can be found on (naturally) long-lost and forgotten Earth. So, without knowing where it is, he heads out. He stops along the way at a planet which is obviously a trap—but while every reader will spot that in two pages, nobody on the ship with author-

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ity seems to guess it. Despite the massing of the alien fleet, however, he breaks free again and goes off toward this Earth whose location he doesn't know.

I sat through a preview of some samples of the forthcoming TV Spectacular. You know, maybe 1999 wasn't so bad, after all.

I'm not sure whether the book is worse than the film will be, or whether the film is worse than the book. Both, I suspect.

Now I'm going to try to cover a fairly large backlog of books with short reviews. Some books are bad, some are good, and many in between.

THE MASTERS OF SOLITUDE, by Marvin Kaye and Parke Godwin (Doubleday, 397 pp., $10.00) is quite a good book through most of the story, if you don't mind reading more about our barbarous descendants after the holocaust. Characterization is quite good; even some of the "bad guys" are rather sympathetically handled, and the only thorough villain in the story has considerable reason for what he does. Most interesting of the characters is Judith, a woman who leaves a great secret city where civilization still carries on and goes out among the semi-savages, looking for a lost great weapon.

The various cultures are well developed. And the battle that builds up through the book is convincing and satisfactory in its development. It moves along as a nicely satisfactory adventure story.

Unfortunately, there are two elements that are there from the beginning, though largely neglected through most of the story. One is this city where science still exists, guarded by a wall of force. The other is Singer, the son of Judith and a local leader, who is held prisoner through most of the book, sulking and refusing to cooperate with his father. The last part of the novel takes us into the city, and that is about as unconvincing as the more primitive cultures were convincing. Anyhow, the big problem the city seemed to pose turns out to be pretty much a pushover. And Singer is forced back on stage as someone with strange power—basically ruining a much better character, and giving a bit of *deus ex machina* effect to the novel's end.

Not a bad book, and enjoyable through most of it; but it could have been better without either Singer or the city.

More happily, Frederik Pohl's memoir, **THE WAY THE FUTURE WAS** (Del Rey Books, 312 pp. plus picture section, $8.95) was a book I found enjoyable from beginning to end. This is the account of Pohl's life in science fiction as ardent fan, editor, agent, and just about anything else you can name. It spans the time from Pohl's discovery of science fiction in 1930 to the present—nearly half a century.

This is the way science fiction really was, as seen through the eyes of a man who has grown with the field, but never out of it. And these are the memories of a man who has learned to be very much himself—more of himself with each passing year. There is a warmth and affection in every line of the book, and these set it completely apart from most accounts of the years of our field. Much of it is told through the incidents that happened, amusing,

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serious, happy and tragic. To me, who already knew most of them, they were freshly engrossing.

The book also gives one of the best overviews of the progress of science fiction I have yet seen. It conveys the feeling of what happened, even more than the events. The feuds and squabbles are shown for what they were. And no mere factual account of the old Futurian fan group can be as honest as this personal reminiscence.

An excellent and valuable book. I wish there could be more like this from the other men who helped make science fiction what it is.

To all fans of the Dumarest books, it's probably welcome news that #18 in the series is out: INCIDENT ON ATH, by E. C. Tubb (DAW Books, 188 pp., $1.50). Dumarest, of course, is the man who goes from planet to planet, looking for some clue that will enable him to locate the planet of his birth—Earth, now only a name of myth. He's endlessly pursued by the priests of the Cyclan, and always finding plenty of action.

I've followed the books with fascination because I keep wondering how long they can continue (since Dumarest does get a bit more information from time to time) and because they average much better reading than any other series I can remember in the field.

This time, Dumarest seems on the verge of finding the answer. An art dealer shows him a detailed painting of a scene that must be Earth! And together with her, he goes to the planet where the artist lives—to discover a strange culture of people gifted with all manner of rare talents. Unfortunately, the world isn't quite the paradise it seems to be. And Dumarest gets involved in a local uprising, which leads him to the truth behind the painting. But the answer, naturally, is not what it seemed.

This is sort of middle-of-the-road Dumarest; it's not one of Tubb's best, though it moves along quite well. Dumarest, the most decent hard-boiled hero I know, is perhaps more interesting than the plot. But it's still a good, quick read.

Whenever a new Poul Anderson novel arrives, I always try to squeeze it into my schedule at the earliest possible moment. But his THE AVATAR (Berkley, 384 pp., $10.00) was something of a disappointment.

There's a lot of sound story in the novel, and Anderson tells his adventures well, as always. He's developed an interesting variation—and perhaps a more sensible version—of the "star gates" that have been filling science fiction recently. This star gate is in space—a device left there by some mysterious Others to enable Earth ships to reach another world for colonization. But while men are spreading out, their social affairs on Earth are becoming badly messed up, and a fanatic group is actually trying to prevent any exploration. When another race is found, they clamp down, trying to suppress the knowledge. As a result, Brodersen is forced to flee through the gate on a path that takes him into the unknown. Hopelessly lost, he must seek from gate to gate, hoping to find a way back—or to find the Others who are behind the gates.

The alien on the ship with the

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humans is a fine example of Anderson's inventiveness—as are the worlds the ship finds on its trip from gate to gate.

Unfortunately—at least to my taste—the whole story is overlaid with Brodersen's sexual hangups with Caitlin. The beauty and wonderfulness of extramarital sex may have its place—but even when his wife understands, it fails to win me over. By the dozenth time, I begin wishing Caitlin would drop dead and let the story go on.

Of course, she doesn't. She's a perfect answer to early adolescent wish dreams by rather naive boys. She's so damned wonderful and charming and loving and understanding that she becomes sickening, like too much honey with saccharine added.

Oh, there's a reason for all that. She's essential to the story, particularly at the end. But I'm afraid that doesn't help. That end strikes me as too much of a cop-out for the problem that had been set up. And if Caitlin is a plant—well, despite the hints that make sense after the facts are all in, her part in it all fails to convince me. It makes for a too convenient and too kitschy ending.

A lot of very nice story material—but I can't quite recommend the book. It seems to be a "bad good book."

By now, every science fiction reader should be familiar with at least some of the works of Andre Norton. (If you haven't read any, hurry out and get a couple.) A whole generation seems to have grown up on her works in the school libraries. And happily, she's still turning out new science fiction novels. The latest is **YURTH BURDEN**

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(DAW Books, 160 pp., $1.75).

This is the story of Elossa, a Yurth girl on a planet where all people of Yurth are despised by the native Raski. She reaches the age where all Yurth must make a pilgrimage to some mysterious place where they will discover some strange truth, but never reveal it to others. On her trip, she saves a Raski boy—one who was sent to prevent her completing her pilgrimage. They go through assorted hassles. But finally, they learn the truth she was seeking—and it fits with what neither has believed. Instead, it leads them on to grimmer adventures.

The ending is a bit so-so, leaving too little explained, though it does solve the basic problems. But it's an entertaining read, if not Norton's best..

Sometimes when looking over DAW Books, it's wiser to pick up the books by previously unknown authors than many other books by better-established names. Wollheim has a genuine talent for discovering good new writers, one he's demonstrated for more than a quarter of a century.

THE PANORAMA EGG, by A. E. Silas (224 pp., $1.75) is another discovery of his. This is an adventure fantasy, and a better example of the current derivatives of sword-and-sorcery than many that are being published today. Panorama eggs are real things, of course; look through a peephole in one and there seems to be a scene inside. Archer is a collector of such curiosae. But when the mysterious gray woman, Mera Melaklos, gives him one, it shows a scene that is far more real than any he's ever seen. So real, in fact, that he is pulled through into the world it shows. And beside him is Melaklos, almost a goddess in this strange world.

Naturally, there's a princess to be rescued—and an evil sorcerer. But unlike most such stories, Archer doesn't just suddenly become the greatest swordsman on the planet. He has to learn to cope with the primitive dangers the hard way. And some of the characters—including the mysterious Melaklos—are a lot more convincing than most in such stories.

Good fun, with a nicely handled ending.

Finally, a book that is both good and beautiful. Gerry de la Ree (7 Cedarwood Lane, Saddle River, N.J. 07458) has been publishing a series of books showing the art of a number of the better science fiction illustrators. Now he has THE SECOND BOOK OF VIRGIL FINLAY ($15.00), covering mostly Finlay's work from 1940 through 1955.

There are more than 120 illustrations in black and white, all superbly reproduced on glossy paper, mostly to the same size as the original drawings. Sufficient to say that this book is at least as beautiful throughout as was the first collection of Finlay. (I find it somewhat better, in fact.) Most of my artist friends are going to drool with admiration over the book.

Finlay was one of the real masters in the field, often imitated and hardly ever equaled. His technique was superb—so good that he could draw to size, rather than two or three times up, and still be sure of adequate reproduction. (Though not of the quality found here.) And the vision with which he drew was the very spirit of science fiction and fantasy. At the price, I think the book is a rare bargain. ■

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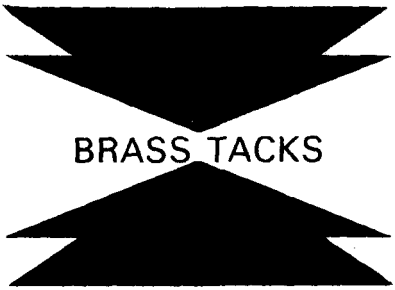

The June issue's Editorial, "Trust the Force," stirred quite a bit of mail—mostly from readers who loved *"Star Wars" and/or "Close Encounters of the Third Kind." A sampling of their responses:*

Dear Sir:

. . . This film, note, has also been denounced by leftist industry haters as "propaganda for technology." This doesn't surprise any dyed in the wool Ayn Rand fan like myself, but as I've eaten up just about every paperback Ballantine ever put out on World War II, I suppose SW intrigues me more as a war movie than as sci/fi. From the former standpoint, I was impressed with the general military concepts.

That film was pure World War II, and many of the dramatic elements you consider missing are part of the subliminal memory fund of the majority of viewers. If you did a really radical job, it would be incomprehensible, because you would be writing by the literary standards of the century and society of your characters.

Your essential story line parallels the Meiji Restoration, the suppression of the Samurai, establishment of a jingo militarist government under a powerless emperor—in Japan. What you got was the background of Pearl Harbor, and a good account of the Battle of Midway. Not very original perhaps, but if things like that happen once, they can happen again. . . .

JAMES J. GLACKIN

19½ N. Fair Oaks Ave.
Pasadena, CA 91103

Mr. Ben Bova,

Oh, come now, Ben! When you were 12 years old did you enjoy works like "Flowers for Algernon" or "A Canticle for Leibowitz?" Perhaps you did, but some of us were absolutely engrossed in pure space opera written by Smith and Campbell.

John W. Campbell would have considered "Star Wars" to be infantile science fiction, space opera, but SF nonetheless. So would E. E. Smith. After all, does not Kimball Kinnison bear some resemblance to a certain pimply-faced Cosmic Strider from a recent film? Does not the good and evil (Kanobi and Vader) of the "Star Wars" universe bear some resemblance to the good and evil (Arisia and Eddore) of the Lensman universe? . . .

MARTHA A. NAREY

Box 9691
Denver, CO

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Dear Ben,

I am at a loss to understand your lack of understanding of the causes underlying the mass enthusiasm for the moving picture SKY WARS. As a science fiction writer and editor you should be the first to understand this.

All young people hate and resent the unfortunate fact that success in this world, with the exception of those few who can strum a guitar and howl like an amorous timber wolf, is dependent on hard work and close attention to duty. This hard work is usually done under the supervision of a ditch water dull older man whom the worker neither likes nor admires. All young people would much prefer a state of civilization in which success is won by the sword and loyalty is more remunerative than industry. . . .

The young men want to emulate Luke. The young women cast themselves in the Princess's role.

This is an old formula. Edgar Rice Burroughs used it in his "Mars" series. His hero, John Carter, never did a day's work in his life. When he arrived on Mars he established himself as a Tharkian aristocrat by killing two green warriors each one of whom was twice as tall and twice as heavy as was John. By risking his life to save the beautiful Deja Thoris he became a nobleman of Helium and married the girl. You just can't beat this way of making a living. Don't work, cut somebody. . . .

NORWIN K. JOHNSON

Box 573
La Canada, CA 91011

Dear Mr. Bova:

I note a curious thing about "Star Wars." Many non-SF reading people of my acquaintance and some movie critics said they were enchanted by the part of the film that takes place on Luke Skywalker's home planet. They liked the "lived-in" look. It seemed to add to the attraction of the movie.

Well now, we all know where "domestication" in SF came from. In no small measure from John Campbell and the Golden Age writers. So the "lived in" look in "Star Wars" (though not of a high order) was derived from modern SF. So the question arises, if Lucas is willing to go this far and it seems to be good box office (Hollywood always understood money), why not something more sophisticated? Why not something like, for example, Poul Anderson's Dominic Flandry stories (Galactic Empire, good conflict, good story) instead of comic book stuff?

At the end of the June editorial you raise a point about the "Force." I will give this much to Lucas's credit. Who is it that saves the day? Who nicks Darth Vader so Luke can do his job? The one guy who does not believe in the "Force." The guy who lives by his wits, Han Solo. (Baloney to anybody that tries to tell me the "Force" brought him on the scene.)

A. A. JACKSON

6342 Sponson Ct.
San Jose, CA 95123

Dear Mr. Bova:

Like you, I am critical of *Star Wars* and *Close Encounters*, if not for all the same reasons, but my candidate for Dumbest Comment of the Year is the one at the end of your June Editorial, where you say that those two films "bear the same relationship to science fiction as the Nazi treatment

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of Poland bore to the Ten Commandments."

The statement is irresponsible, irrational, not thought out, hyperbolic to the point of nonsense, emotional to the point of hysteria, and comparable to the remarks of those cretins who say that the use of the term "sci-fi" is just like calling a black person a "nigger" or a Jew a "kike."

Exaggeration can be an effective polemical tool, but not when it loses all contact with reality and lacks the redeeming element of humor.

The acrid odor of sour grapes hangs over the whole Editorial, in fact. The only message that emerges is: Oh, how I hate Hollywood for nixing my *Brillo* series, and oh how I wish I were raking in all that lovely *Star Wars/Close Encounters* cash, instead of mean old nasty undeserving Them.

STEWART J. HUNT
11908 Montana Ave.
Los Angeles, CA 90049

Dear Mr. Bova,

. . . Both "Star Wars" and "Close Encounters" do depend heavily on their sound tracks (as well as on visual effects). So did "2001"—and a lot of people found the ending of that movie more bewildering than profound.

You praise the sense of wonder ("Both films show . . . that there are wondrous worlds to be seen") but condemn it in the next sentence (" 'Star Wars' allows the audience to turn off its brain . . . "). You rail at Hollywood people for preferring emotion over logic in stories, then wish producers made movies with that attitude. If they did, wouldn't the resulting films be even more emotional and less logical than the ones we see now?

In a man-robot team, could a fallible human cop using his emotional insight end up solving his cases? Ask Lije Baley and R. Daneel Olivaw. Editors, producers, detectives, and even Federation starship captains need *both* emotion and logic to do their work, which involves understanding people (and other beings). . . .

NATALIA MAYER
744 Briar Hill Ave.
Toronto, Ont.
Canada M6B 1L3

Dear Mr. Bova:

"Trust the Force," (the editorial of June 1978) represents a narrow technological view of the Universe and of Man's place in it. Surely the 'Sense of Wonder' engendered by *Star Wars* and *Close Encounters* deserves better treatment by SF editors than to be compared (unfavorably) to Hitler's invasion of Poland. . . .

I am married to a practicing psychic who routinely uses clairvoyance, precognition, and other skills that I feel were also eons in the making. She "Trusts the Force" and there is no computer system existing that can come close.

"Trust the Force?"—with training and proven ability, yes!

"Trust the Computer?"—garbage in; garbage out.

ARLAN KEITH ANDREWS
2210 East 70th Street
Indianapolis, IN 46220

Dear Mr. Bova:

Well E-X-C-U-S-E me! Star Wars was a fantasy, f-a-n-t-a-s-y Mr. Bova! No-one seems to be upset when Robin Hood puts his sword through the villain, and it doesn't seem to bother

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anyone that Conan uses his double-bladed ax more often than his brains.

Furthermore, the reason Luke decided to use the Force instead of his targeting computer is that it had already been established that the computer was not accurate enough to drop the torpedoes into the exhaust shaft. Under the urgings of Ben Kenobi's spirit, therefore, Luke decided to give the Force a chance. I'm sorry he didn't consult you about it.

As for Close Encounters of the Third Kind, I can't believe you were in the right theater. The film doesn't try to state that the common man can handle things like visitations better than trained personnel, the scientists realize that they must evacuate the town before some clown tries to "defend" his country by shooting one of the aliens. The only reason Richard Dreyfuss was able to handle what was happening to him was that he hadn't lost *his* "sense of wonder." The scientists were not "left with their mouths hanging open" as you put it, they completed all their experiments and gathered all the data they needed. The film isn't too kind to the military and their "Catch 22" type rule, but everybody already knows that military intelligence is a contradiction in terms so where's the harm in saying it once again? . . .

EDWARD J. RHODES
311 East 92 St.
NYC 10028

As usual, the Editor has the last word. There's little more to say, since the June Editorial expressed my views at some length. I do think that the anti-intellectualism in Hollywood is so deeply ingrained in the producers of movies and the viewers *that most people can't even see it anymore. But that same kind of know-nothingism, that same kind of distrust of intellect, has led to tyranny in the past. And it could again in the future.* *(BEN BOVA)*

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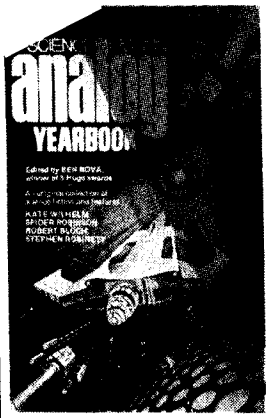

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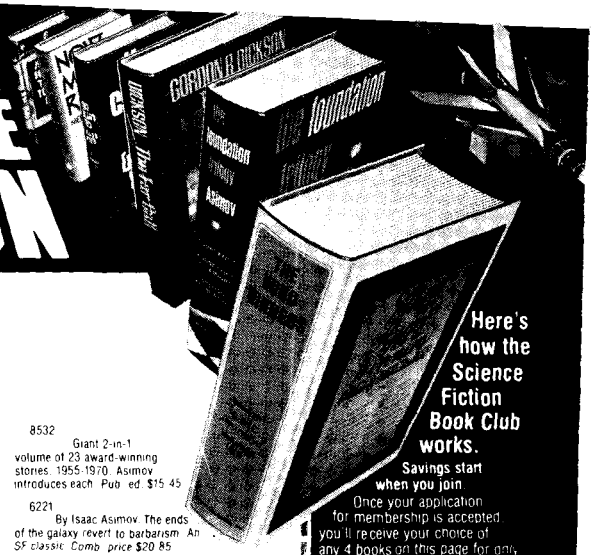

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